



**Facultad de Ciencias Económicas y Empresariales**

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**DOBLE GRADO INTERNACIONAL EN ADE Y ECONOMÍA**

**TRADE-OFFS IN HEALTH INVESTMENTS**

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## **EXECUTIVE SUMMARY**

In spite of the current medical advancements, the developing world is losing millions of lives each year due mainly to three pervasive illnesses: Malaria, HIV and Chronic Malnutrition. This work analyzes the trade-offs observed between health investments made on these three diseases in Ghana and Nigeria and explores their incidence during the period 2006 to 2015. We use data from the OCDE credit report system data base together with data on incidence from the World Health Organization, World Bank, Global Fund and the Bill and Melinda Gates Foundation. Results of the cross-analysis of these data show that there are larger investments made in Malaria and HIV in both countries than in chronic malnutrition despite the incidence of the later is higher in Ghana and Nigeria, than the incidence of HIV and Malaria. We identify and discuss several factors that may explain the apparently low investments in chronic malnutrition, as well as the larger investments in HIV and Malaria.

## **KEY WORDS**

Malaria, HIV, Malnutrition, Investments, Health, Ghana, Nigeria, Developing, Refugees, World Bank, OECD, UNHCR, Health Economics, Development

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## 1.INTRODUCTION

As the famous proverb says, *Health is wealth*.

In this case study, we are going to analyze the trade-offs of health investments made on three pervasive diseases- Malaria, HIV and chronic malnutrition- in two developing countries, Ghana and Nigeria, looking at not only the major investments but also at the incidence of these three main health issues selected, during the period 2006 to 2015. Therefore, the principal focus of this study is related not only to health but also to economics, since we question about the appropriateness of the investments according to the disease incidence. This is a relevant analysis since there is evidence of donor investments made in the past that in some cases were too large when the incidence of the disease in the country is considered. For instance, several trends indicate that despite the concurrent global stagnation in population with HIV, HIV/AIDS investment levels in several sub-Saharan African approximate or exceed the entirety of their national health budgets (Shiffman, 2007).<sup>1</sup>

The relationship between Health and Economics is well established. Health plays a significant role in the development of human capital, which increases productivity and income of a region and stimulates economic growth (WHO, 2004)<sup>2</sup>. Moreover, health is considered as one of the constituent components for development (Sen, 1999).<sup>3</sup> Even though health investments are justified by their intrinsic value as an essential capability, they are also justified by their instrumental value in contributing to other social objectives as educational performance, labor productivity, reduction of poverty, enhancement of investments and thus the stimulation of economic growth. (Frenk, 2014).<sup>4</sup> Studying how resources are allocated to and within any country is therefore a crucial area of research known as health economics. The final objective of this study is to determine whether the allocation of resources has been done effectively and in an accurate manner in order to prevent and battle the selected diseases in the areas of higher incidence. Malaria, HIV and Malnutrition are among the illnesses with higher incidence in Africa. In addition, two of them have also a notorious repercussion worldwide, HIV, since it affects not only developing countries but also developed countries, and with a lower impact Malaria, as a result of the strong support received from renown

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<sup>1</sup> Shiffman, J. (2007, October 31). Has donor prioritization of HIV/AIDS displaced aid for other health issues?

<sup>2</sup> World Health Organization. (2004). Poverty Reduction Strategy Papers: Their Significance for Health.

<sup>3</sup> Sen, A. (1999). Development as freedom.

<sup>4</sup> Frenk, J. (2014). Health and the Economy.

institutions such as the World Health Organization, the World Bank, and specially the Bill and Melinda Gates Foundation (HIV) and the Global Fund (malaria). Nigeria is the most populous country and the largest economy of the African continent; in addition, the country has an increasing incidence of HIV, Malaria and Malnutrition and significant investments have been made in order to battle them. Whereas the proximity of Ghana to Nigeria not only geographically but also in the incidence and health investments, makes of it a good country to compare with Nigeria.

The structure followed by this study is the following: first, we begin with a brief description of the selected diseases and countries (Section 2. Background). The study continues with the explanation of the data base and methods used (Section 3. Data and Methodology) and the results of the comparative analysis of the data obtained (Section 4. Investments and Incidence: A Comparative Analysis). Finally, a discussion and conclusions are offered in the last part of the project (Section 5. Discussions and Conclusions).

## **2. BACKGROUND**

### **2.1. Malaria, Malnutrition and HIV**

Health is crucial for the development of a country, in fact, according to Jeffrey D. Sachs, a high disease burden in a region can cause a poverty trap.<sup>5,6</sup> In this section, some insights about the three selected diseases for this case study, Malaria, Malnutrition and HIV; are given in order to present a general idea about the illnesses, its causes and consequences, incidence, remedies available and worldwide actions to battle them.

#### *2.1.1. Malaria*

Malaria is a preventable and treatable infectious disease caused by parasites of the Plasmodium family and transmitted by female Anopheles mosquitoes. There are four different malaria species: *P. falciparum*, *P. vivax*, *P. malariae* and *P. ovale*. The first two are

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<sup>5</sup> Sachs, J. D. (2004). Ending Africa's Poverty Trap.

<sup>6</sup> The Poverty Trap: Poverty Itself as a Cause of Economic Stagnation. The key problem for the poorest countries is that poverty itself can be a trap. When poverty is very extreme, the poor do not have the ability – by themselves – to get out of the mess. This is because, when people are utterly destitute, all energy goes into survival and there is no capacity to save anything for the future. This is the main reason why the poorest of the poor are most prone to becoming trapped with low or negative economic growth rates. (*Sachs, J. (2005). The End of Poverty: How We Can Make It Happen In Our Lifetime.*) See Figure 24. Poverty Trap (Annex 5)



the most prevalent species of malaria and *P. falciparum* is the most dangerous. *P. knowlesi* is a zoonotic plasmodium that is also known to infect humans.<sup>7</sup>

Many medical advancements have been made in order to prevent, diagnose and treat malaria. The main methods used for the prevention of malaria are long-lasting insecticidal nets (LLINs), indoor residual spraying (IRS) in which insecticides are sprayed on the walls of homes, and intermittent preventive treatment for pregnant women (IPTp).<sup>8</sup> Despite the efforts of the last years in the development of a vaccine against malaria, nowadays there is no licensed malaria vaccine. The RTS,S/AS01 is the most advanced vaccine against the most dangerous specie, the *P. falciparum*. Researches to find a vaccine against malaria are currently taken and more than 20 other vaccines are being evaluated as we can see in *Figure 23. Global malaria vaccine pipeline (Annex 5)*.<sup>9</sup>

Malaria kills each year more than one million people, the majority in sub-Saharan Africa, where malaria is the leading cause of death for children under five. In fact, more than 90% of malaria deaths occur in Sub-Saharan Africa; where Nigeria and Democratic Republic of the Congo account for about the 40% of estimated mortality due to malaria worldwide. In addition, half of the world's population, 3.2 billion people, is at risk of infection.<sup>10</sup>

The populations with the highest biological risk of getting infected by malaria are infants and young children (from six months to five years), pregnant women, non-immune people (as for travelers, laborers and populations moving from low-transmission to high-transmission areas) and people living with HIV/AIDS.<sup>11</sup> Malaria is a global emergency that perpetuates a vicious cycle of poverty in the developing world.<sup>12</sup> For this reason, malaria has been a main point of the discussion for the development of poor countries among international institutions. Actually, it was present in the Millennium Development Goals (MDG) in 2000 and it is a target of the Sustainable Development Goals (SDG) in 2015 of the United Nations.

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<sup>7</sup> World Health Organization. (2016). Global Technical Strategy for Malaria 2016-2030.

<sup>8</sup> Roll Back Malaria Partnership. (2008). The Global Malaria Action Plan, For a Malaria-Free World.

<sup>9</sup> World Health Organization (WHO). (2016, October 5). Immunization, Vaccines and Biologicals. Retrieved from [http://www.who.int/immunization/research/development/Rainbow\\_tables/en/](http://www.who.int/immunization/research/development/Rainbow_tables/en/)

<sup>10</sup> Roll Back Malaria Partnership. (2017). Retrieved from <http://www.rollbackmalaria.org/about-rbm>

<sup>11</sup> World Health Organization. (2007). Gender, Health and Malaria.

<sup>12</sup> World Health Organization. (2016). Global Technical Strategy for Malaria 2016-2030.

Target 6.C of the MDG was to have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.<sup>13</sup> The target was reached as we will observe later in

*Figure 8. Malaria Incidence 2000-2015, a World Overview (per 1,000 population at risk).* The SDG take a step forward and in Goal 3 (Ensure healthy lives and promote well-being for all at all ages) they include the target of ending by 2030 the epidemics of malaria among other diseases.<sup>14</sup>

In addition, the Global Technical Strategy for Malaria 2016-2030 by the World Health Organization provides a guidance to countries and development partners towards the elimination of malaria. The target proposed is to reduce malaria by 90% by 2030 and for arriving there they highlight the need of increasing investments in preventive measures, diagnostic testing, treatment, disease surveillance, innovation and research.<sup>15</sup>

The endeavors made in reducing malaria incidence and mortality since 2000, were possible due to the large increases in the financing of malaria control and elimination programs.<sup>16</sup> In fact, investments in malaria control for developing countries went up from \$<sup>2015</sup>33 million in 2002 to \$<sup>2015</sup>1.8 billion in 2015. The efforts were focused the very first years in India, where more than the 60% of the investments were made in 2002. Nevertheless, nowadays the focus is in Africa where more than the 80% of 2015 investments were incurred.<sup>17</sup> The investments made in battling malaria between 2001 and 2015 contributed to reduction of malaria mortality rates almost by half, a 47%. In Africa, the reduction was even higher when referring to one of the most vulnerable populations to malaria, children under 5 years, with a reduction of 58%. Moreover, the incidence of malaria was reduced by 30% during the same period.<sup>18</sup>

Coordination among international institutions and affected countries is crucial for the eradication of this preventable and treatable infectious disease.

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<sup>13</sup> United Nations. (n.d.). Millenium Development Goals and Beyond 2015. Retrieved from <http://www.un.org/millenniumgoals/aids.shtml>

<sup>14</sup> United Nations. (n.d.). Sustainable Development Goals. Retrieved from <http://www.un.org/sustainabledevelopment/health/>

<sup>15</sup> World Health Organization. (2016). Global Technical Strategy for Malaria 2016-2030.

<sup>16</sup> World Health Organization (WHO). (2016). World Malaria Report.

<sup>17</sup> OECD. (2016). OECD Stats. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>

<sup>18</sup> World Health Organization. (2016). Global Technical Strategy for Malaria 2016-2030.

### 2.1.2. *Malnutrition*

Malnutrition alludes to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. Two groups are distinguished among malnutrition conditions, undernutrition and overweight. Undernutrition is comprised of stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). On the other hand, overweight involves obesity and diet-related non-communicable diseases (as for heart diseases, stroke, diabetes and cancer).<sup>19</sup> During this study we will put the emphasis on the first group, undernutrition, and more concretely in stunting (height for age).

Stunting is an undernutrition disease. It alludes to the insufficient height of a child for his or her age as result of chronic or recurrent malnutrition. Stunting affects not only the physical conditions of a child but also his/her cognitive skills; in addition to a reduced productive capacity, poor health and an increased risk of degenerative diseases such as diabetes.<sup>20</sup> The factors that contribute to stunted growth and development include poor maternal health and nutrition, inadequate infant and young child feeding practices, and infection.<sup>21</sup>

In 2015, two out of ten children under five were considered stunted. In fact, in 2015, 156 million children under five suffered from stunting worldwide from which a 56% lived in Asia and 37% in Africa. Progress has been made since 2000 regarding stunting rates, from 198 to 156 million stunted children, nonetheless this progress has not been the same in all regions. Actually, from 2000 to 2015, Asia and Latin America and Caribbean managed to diminish stunting rates by over one third whereas Africa's reduction during the same period was of one sixth. Even though, stunting rates are diminishing over time in all regions, the number of African stunted children is increasing, in 2015 there were 8 million stunted children more than in 2000, from which 4 million lived in Western Africa.<sup>22</sup>

Researches show that the first 1,000 days, since the pregnancy of the mother until the two years of the child, are crucial for his/her development.<sup>23</sup> As mentioned before, stunted

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<sup>19</sup> World Health Organization. (2016, July 8). What is malnutrition? Retrieved from <http://www.who.int/features/qa/malnutrition/en/>

<sup>20</sup> UNICEF. (2013). The state of the world's children 2013. Children with disabilities.

<sup>21</sup> World Health Organization. (2014). Global nutrition targets 2025: stunting policy brief. Geneva.

<sup>22</sup> UNICEF; World Bank Group; World Health Organization. (2016). Levels and Trends in Child Malnutrition

<sup>23</sup> Shekar, M., Kakietek, J., D'Alimonte, M., Sullivan, L., Walters, D., Rogers, H., . . . Hecht, R. (2016). Investing in Nutrition, the Foundation for Development, an Investment Framework to reach the Global Nutrition

children have weaker immune system, which makes them more susceptible to death and diseases. They also have a diminished cognitive capacity which impacts their ability to learn and develop; and therefore, in their ability to earn higher incomes later in life, generating poverty trap.<sup>24</sup>

International bodies have made different efforts in order to reduce the incidence of stunting over the years. In fact, stunting was present in goal 1 of the Millennium Development Goals, 'Eradicate extreme poverty and hunger', where the Target C exposed to reduce by half, between 1990 and 2015, the proportion of people who suffer from hunger.<sup>25</sup> Stunting is not mentioned specifically, but it was covered by the MDG of the United Nations. Sustainable Development Goals have continued the path of MDG but with a more ambitious goal: Goal 2, 'End hunger, achieve food security and improved nutrition, and promote sustainable agriculture', where Target 2.1. establishes the end by 2030 of all forms of malnutrition.<sup>26</sup>

In addition, since 2012 the 194 member states of the World Health Assembly have joined their efforts and they have established several targets to improve nutrition towards the horizon 2025 focusing on six areas: stunting, exclusive breastfeeding, wasting, anemia, low birth weight, and overweight. Regarding the area of stunting, the target to achieve is the reduction of a 40% the number of children under five stunted, which accounts for at least 65 million fewer stunted children in 2025, with an estimated investment of \$49.5billion. The actions determined in order to arrive to the target established are the following: an antenatal micronutrient supplementation for 180 days per pregnancy, the promotion of good infant and young child nutrition and hygiene practices, a balanced energy-protein supplementation for pregnant women living under the poverty line, an intermittent preventive treatment for malaria in pregnancy, vitamin A supplementation for children of 6 to 59 months,

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Targets. The World Bank; Results for Development; Bills & Melinda Gates Foundation; Children's Investment Fund Foundation; 1,000 Days.

<sup>24</sup> Shekar, M., Kakietek, J., D'Alimonte, M., Sullivan, L., Walters, D., Rogers, H., . . . Hecht, R. (2016). Investing in Nutrition, the Foundation for Development, an Investment Framework to reach the Global Nutrition Targets. The World Bank; Results for Development; Bills & Melinda Gates Foundation; Children's Investment Fund Foundation; 1,000 Days.

<sup>25</sup> United Nations. (n.d.). Millenium Development Goals and Beyond 2015. Retrieved from <http://www.un.org/millenniumgoals/aids.shtml>

<sup>26</sup> United Nations. (n.d.). Sustainable Development Goals. Retrieved from <http://www.un.org/sustainabledevelopment/health/>

prophylactic zinc supplementation for children of 6 to 59 months, public provision of complementary foods for children of 6 to 23 months living under the poverty line.<sup>27</sup>

The endeavors made in reducing the incidence of stunted children were possible due to the large increases in the financing of basic nutrition programs as the ones mentioned above. In fact, investments in basic nutrition for developing countries went up from \$<sup>2015</sup>142 million in 2002 to \$<sup>2015</sup>866 million in 2015. The efforts were focused the very first years in South and Central Asia, where more than the 40% of the investments were made in 2002, centering the attention in India where the figure was 30%; facing the 27% of Africa. Nevertheless, nowadays the contrary situation occurs, the focus is on Africa where more than the 50% of 2015 investments were incurred, facing the 30% of Asia, that currently is more spread among the continent.<sup>28</sup>

Despite the increase of investments in basic nutrition over time, if we compare them to the investments made in malaria, we are far behind, almost a billion US dollars at constant prices of 2015. Stunting is a problem faced by millions of children and that is restraining development in poor countries and urgent action needs to be taken.

### 2.1.3. *HIV/AIDS*

HIV corresponds to the acronym Human Immunodeficiency Virus. This virus targets the immune system and weakens people's defense systems by destroying and impairing the function of immune cells. It is measured by the CD4 cell count.<sup>29</sup>

AIDS corresponds to the acronym Acquired Immunodeficiency Syndrome, which is the most advanced stage of HIV infection. It is defined by the development of certain cancers, infections, or other severe clinical manifestation, which can arise, depending on the characteristics of the individual, in various times of HIV; usually between the second and the fifteenth year of the disease.<sup>30</sup>

The transmission of HIV can be through the exchange of a variety of body fluids from infected individuals as for semen, vaginal secretions, blood and breast milk. HIV is a non-

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<sup>27 24</sup> Investing in Nutrition, the Foundation for Development, an Investment Framework to reach the Global Nutrition Targets. The World Bank; Results for Development

<sup>28</sup> OECD. (2016). OECD Stats. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>

<sup>29</sup> World Health Organization (WHO). (2016, November). HIV/AIDS Fact Sheet. Retrieved from <http://www.who.int/mediacentre/factsheets/fs360/en/>

<sup>30</sup> World Health Organization (WHO). (2016, November). HIV/AIDS Fact Sheet. Retrieved from <http://www.who.int/mediacentre/factsheets/fs360/en/>

curable disease but treatable with effective antiretroviral drugs (ARV), which helped in control of the virus and prevent its transmission. According to WHO's estimations, only a 60% of HIV infected people currently know their status.<sup>31</sup>

HIV has a high incidence worldwide, in fact, approximately 37 million people are currently infected with HIV, from which 2 million people were infected with the disease in 2015. Moreover, more than 35 million people have lost their life due to HIV, from which 1.1 million died in 2015. The world's region with the highest number of infected people is Sub-Saharan Africa, where more than the 70% of HIV infected people live, more than 25 million people, in 2015. In addition, Sub-Saharan Africa is also the region with the highest number of HIV new infections, accounting for the two thirds of new global infected people in 2015, around 1.3 million people.<sup>32</sup>

The prevention of HIV is based in the following actions: male and female condom use; testing and counseling of HIV and STI (Sexually Transmitted Infections); testing and counseling of TB (Tuberculosis, leading cause of death among HIV infected people); voluntary male medical circumcision (reduces the risk of infection in male up to a 60%); prevention with Antiretroviral (ARV) drugs (reducing the risk of transmission by 96%); harm reduction for injecting drug users (i.e. needle and syringe programs, information and education, etc.); and the elimination of mother to child transmission (EMTCT) of HIV (by the prevention with ARVs to the mother and the child during pregnancy, labor and post-natal period).<sup>33</sup>

International bodies have made different efforts in order to reduce the incidence of HIV over the years. In fact, HIV was present in goal 6 of the Millennium Development Goals, 'Combat HIV/AIDS, Malaria and other diseases', where the Target A exposed as a goal to have halted the between 1990 and 2015, and begun to reverse the spread of HIV/AIDS; and in Target B stated the achievement by 2010 of universal access to treatment. The targets were partially fulfilled, as for the decrease in the number of new infected people, that fell around

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<sup>31</sup> World Health Organization (WHO). (2016, November). HIV/AIDS Fact Sheet. Retrieved from <http://www.who.int/mediacentre/factsheets/fs360/en/>

<sup>32</sup> World Health Organization (WHO). (2016, November). HIV/AIDS Fact Sheet. Retrieved from <http://www.who.int/mediacentre/factsheets/fs360/en/>

<sup>33</sup> World Health Organization (WHO). (2016, November). HIV/AIDS Fact Sheet. Retrieved from <http://www.who.int/mediacentre/factsheets/fs360/en/>

40% between 2000 and 2013; and the increase in the number of ARV treated people.<sup>34</sup> Sustainable Development Goals have continued the path of MDG but with a more ambitious goal: Goal 3, 'Ensure healthy lives and promote well-being for all at all ages', where target is to end the epidemic of AIDS by 2030.<sup>35</sup>

Another relevant international commitment for the battle against HIV was the "Global Health Sector Strategy on HIV for 2016-2021" concluded at the sixty-ninth World Health Assembly (WHA) that established the steps to follow in order to accomplish the specific targets of the SDG.<sup>36</sup>

In addition, the United Nations Population Fund (UNFPA) battles against HIV with its co-sponsor UNAIDS. The mission of UNFPA's programs is halting the new infections of HIV, discrimination and AIDS related deaths by the promotion of human rights, the reduction of inequalities<sup>37</sup> UNAIDS offers another strategy to battle HIV, the 90-90-90 by 2020. The ambitious plan settles that by 2020 90% of all people living with HIV will know their status; 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy; and 90% of all people receiving antiretroviral therapy will have viral suppression.<sup>38</sup>

In fact, investments in HIV for developing countries went up from \$<sup>2015</sup> 1.1 billion in 2002 to \$<sup>2015</sup> 6.2 billion in 2015. The efforts were focused in Africa since the beginning, with an increasing share of the percentage of investments in developing countries from more than a 35% in 2002 to more than the 55% in 2015.<sup>39</sup>

HIV/AIDS is among the three diseases studied the one with the highest investments in developing countries worldwide since the beginning.

## **2.2. Nigeria and Ghana**

This section is devoted to a brief description of the two main countries of interest and its health system, as a congruent context previous to the case-study.

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<sup>34</sup> United Nations. (n.d.). Millenium Development Goals and Beyond 2015. Retrieved from <http://www.un.org/millenniumgoals/aids.shtml>

<sup>35</sup> United Nations. (n.d.). Sustainable Development Goals. Retrieved from <http://www.un.org/sustainabledevelopment/health/>

<sup>36</sup> World Health Organization (WHO). (2016). Global Health Sector Strategy on HIV 2016-2021

<sup>37</sup> United Nations Population Fund (UNFPA). (2016, December 14). HIV & AIDS. Retrieved from <http://www.unfpa.org/hiv-aids>

<sup>38</sup> UNAIDS. (2015). On the Fast-Track to end AIDS, UNAIDS Strategy 2016-2021

<sup>39</sup> OECD. (2016). OECD Stats. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>



### 2.2.1. Nigeria

Nigeria is a Western African country located in the Gulf of Guinea, between Benin and Cameroon. It is included in the region of Sub-Saharan Africa according to the World Bank (Layout 1, Annex 2). Former British colony, it obtained its independence in 1960. Nigeria is a federal presidential republic whose capital is Abuja, located in the middle of the country.

#### 2.2.1.1. Country

Nigeria is the most populous country in Africa, with a current population of around 190 million people, representing the 2,55% of world's population. In fact, Nigeria ranks as number 7 of the world's list of countries by population after China, India, USA, Indonesia, Brazil and Pakistan<sup>40</sup>. The average growth of the population in the county is 2,5% yearly, with a life expectancy of 53 years (2014, Table 1 *Development Indicators*) and a median age of 18<sup>41</sup> year. In Nigeria 48% of the population lives in urban areas.

Nigeria is considered a low-middle income country according to the Word Bank estimates of GINI per capita 2014 (Layout 3, *Annex 2*), with a GINI per capita between \$1,046 and \$4,125. Nevertheless, it has one of the highest rates of poverty in Africa with more than half of its population in 2012 living under extreme poverty, with less than 2011 PPP \$1,90 a day (Layout 2, *Annex 2*). In addition, there is an accused difference in poverty lines among rural and urban areas, where around the 53% of rural population lives poverty lines compared to a 34% in urban areas. Moreover, with respect to the wealth distribution of the country, Nigeria's income inequality is high with a Gini coefficient of 43% in 2005.<sup>42</sup>

Regarding education, Nigeria has a high primary completion rate (among years 2010-15) rounding the 70% to 84% (Layout 4, *Annex 2*). According to the World Bank "the primary completion rate is the proportion of new entrants in the last grade of primary education among the total population at the entrance age for the last grade of primary education"; which makes it a good indicator for reflecting the coverage of the education system.

With respect to the economic situation, Nigeria is the largest economy in Africa, with a GDP of \$0.5 trillion in 2015. The oil sector has been the major source of benefits for the country

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<sup>40</sup> Worldometers. (2017). World Population. Retrieved from <http://www.worldometers.info/world-population/>

<sup>41</sup> Central Intelligence Agency (CIA). (2017). The World Fact Book. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/>

<sup>42</sup> African Development Bank Group, OECD and UN. (2016). African Economic Outlook, Sustainable Cities and Structural Transformation.



since its independence. As for the composition of the GDP by sector of origin, in 2016 it was composed by a 21,1% of the primary sector, a 19,4% of the industrial sector and 59.4% of the tertiary sector; nonetheless more than half of the population works in the agricultural sector.<sup>43</sup>

In addition, in Nigeria we can observe huge differences in terms of development among the thirty-six states of the country, which is increasing due to the growing share of violence. The North-Western states, as for Borno, are suffering from the terrorist attacks of the insurgent group of Boko Haram, which are more violent since 2009. The Boko-Haram insurgency is having a huge negative impact not only on the security of the country and the neighboring countries of the lake Chad, but also in social and economic terms.<sup>44</sup> A study by the International Organization of Migration showed that since the beginning of the insurgency, over 2000 schools had closed, 600 teachers and more than fifteen thousand civilians were killed. The violent environment has led to around 2.5million of Internally Displaced People and Refugees in the country in 2015 (Table 6, *Annex 3*). From around the 150 thousand of Nigerian refugees in 2015, most of them went to the bordering countries mainly to Cameroon and Niger, but also to Chad. Moreover, some of them went to developing countries, for instance around 3,500 Nigerian refugees went to Italy (Table 7, *Annex 3*).

#### 2.2.1.2. *Health System*

Nigerian health system is characterized by a low public expenditure, lower than average Africa expenses in health, more concretely Nigeria only reported for health expenses in 2013 a 3.7% of its GDP, which accounted for an average expenditure of \$115 per capita. Moreover, the results of a survey made between 2008 and 2009 show that per 1,000 inhabitants there were 41 physicians and 161 nurses. (Table 9, *Annex 4*). As mentioned before, the median life expectancy of the Nigerians in 2015 was 53 years, one of the lowest in the African continent with an average of 61 years.

The major diseases of the African region reported by the 2016 report of de AfDB, the OECD and the UN in the Economic Outlook of the Region were HIV, Malaria, Tuberculosis and Measles; in addition to vaccination rates of Meningococcal (MCV) and Diphtheria-tetanus-

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<sup>43</sup> Central Intelligence Agency (CIA). (2017). The World Fact Book. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/>

<sup>44</sup> African Development Bank Group, OECD and UN. (2016). African Economic Outlook, Sustainable Cities and Structural Transformation.

pertussis (DTP3). In the case-study of Nigeria, the adult prevalence of HIV/AIDS was 3.2% in 2014, lower than the African average (3.8%), this disease represented in 2014 around 174 thousand deaths. With respect to malaria, tuberculosis and measles, 550 thousand cases of malaria in 2013, 86 thousand new and relapse cases of tuberculosis in 2014 and 7 thousand cases of measles in 2014 were reported. Regarding the vaccination coverage, 51% and 66% of the population was vaccinated against MCV and DTP3 respectively in 2014 (Table 10, *Annex 4*).

### 2.2.2. *Ghana*

Ghana is a Western African country located in the Gulf of Guinea between Cote d'Ivoire and Togo. It is also included as part of the region of Sub-Saharan Africa according to the World Bank (Layout 1, *Annex 2*). Former British colony, Ghana was the first sub-Saharan country in colonial Africa to gain its independence in 1957. Ghana is a presidential republic whose capital is Accra, a coastal city located in the South-East part of the country.

#### 2.2.2.1. *Country*

Ghana is the 48<sup>th</sup> most populous country in the world, with a current population of around 28 million people, representing the 0,4% of world's population<sup>45</sup>. The average growth of the population in the county is 2,4% yearly, with a life expectancy of 61 years (*2014*, Table 1 of *Development Indicators*) and a median age of 21 years<sup>46</sup>.

Ghana is considered a low-middle income country according to the Word Bank estimates of GINI per capita 2014 (Layout 3, *Annex 2*), with a GINI per capita between \$1,046 and \$4,125. Ghana has one of the lowest rates of poverty in Sub-Saharan Africa, between a 10% and 24,9% of its population in 2012 was living under extreme poverty, with less than 2011 PPP \$1,90 a day (Layout 2, *Annex 2*), in fact the exact number for Ghanaian population below the national poverty line in 2012 is 24,2%. In addition, there is an accused difference in poverty lines among rural and urban areas, where around the 38% of rural population lives poverty lines compared to a 10% in urban areas in 2012. Moreover, with respect to the wealth

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<sup>45</sup> Worldometers. (2017). World Population. Retrieved from <http://www.worldometers.info/world-population/>

<sup>46</sup> Central Intelligence Agency (CIA). (2017). The World Fact Book. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/>

distribution of the country, Ghana's income inequality is high with a Gini coefficient of around the 43% in 2005, similar to Nigeria.<sup>47</sup>

Regarding education, Ghana has one of the highest primary completion rate (among years 2010-15) overcoming the 95% (Layout 4, *Annex 2*). According to the World Bank, completion rate is a good indicator for reflecting the coverage of the education system.

With respect to the economic situation, Ghana is market-based economy in Africa, with a GDP of \$42,76 billion in 2015. As for the composition of the GDP by sector of origin, in 2016 it was composed by a 19,5% of the primary sector, a 24% of the industrial sector and 56,4% of the tertiary sector; nonetheless almost half of the population, a 44,7%, works in the agricultural sector.<sup>48</sup>

#### 2.2.2.2. *Health System*

Ghanaian health system is characterized also by a low public expenditure, but like the average Africa expenses in health, more concretely Ghana only reported for health expenses in 2013 a 5.4% of its GDP, which accounted for an average expenditure of \$99.5 per capita. Moreover, the results of a survey made in 2010 show that per 1,000 inhabitants there were 10 physicians and 93 nurses. (Table 9, *Annex 4*). As mentioned before, the median life expectancy of the Ghanaian in 2015 was 61 years, the same as the mean for the African continent.

The incidence of the major diseases in Ghana is assorted, where measles and tuberculosis are of lower relevance than malaria and HIV, and where almost the totality of the population in Ghana is vaccinated of Meningococcal and Diphtheria-tetanus pertussis. More concrete, the adult prevalence of HIV/AIDS in Ghana was 1.5% in 2014, lower than the African average (3.8%), this disease represented in 2014 around 9 thousand deaths. With respect to malaria, tuberculosis and measles, 1.6million cases of malaria in 2013, 14.6 thousand new and relapse cases of tuberculosis in 2014 and 124 cases of measles in 2014 were reported. Regarding the

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<sup>47</sup> African Development Bank Group, OECD and UN. (2016). African Economic Outlook, Sustainable Cities and Structural Transformation.

<sup>48</sup> Central Intelligence Agency (CIA). (2017). The World Fact Book. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/>

vaccination coverage, 92% and 98% of the population was vaccinated against MCV and DTP3 respectively in 2014<sup>49</sup>, a much rate that the one for Africa. (Table 9, *Annex 4*).

### 2.2.3. *Why Nigeria? Why Ghana?*

Nigeria is the most populous country of Africa, with a population of 183 million Nigeria which represented in 2015 the 2.5% of World's population and the 15.4% of Africa's population, being the seventh country in the world by population.<sup>50</sup> Nonetheless, as regards the surface of the country, Nigeria represents a 0.70% of the world's total surface, which is almost two times Spain. Nigeria is not only the most populous country in Africa but also the largest economy in the continent, with a GDP of \$0.5 trillion in 2015, a 10% of the total GDP in Africa.<sup>51</sup>

On the other hand, Ghana's population of 28 million represented in 2015 the 0.4% of World's population and the 2.3% of Africa's population; it is the forty-eighth country in the world by population.<sup>52</sup> In regard to the surface of the country, Ghana represents a 0.17% of the world's total surface, which is less than half the surface of Spain. Ghana's economy is smaller with a GDP in 2015 of \$37 billion, which accounted for less than a percent of Africa's total GDP.<sup>53</sup>

Another factor considered during the selection of the regions of study was the violent situation that is now suffering the country and the neighboring areas with the terrorist insurgency of Boko Haram since 2009. The situation is causing long term social and economic damage to the country, where there are more than 2.1 million people displaced, more than 15 thousand deaths and more than one million children out of school.<sup>54</sup> The situation of the country became visible internationally when 200 girls were kidnapped in 2014 from Chibok's school, and the social movement '#bringbackourgirls' arose.

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<sup>49</sup> African Development Bank Group, OECD and UN. (2016). African Economic Outlook, Sustainable Cities and Structural Transformation.

<sup>50</sup> United Nations (Department of Social and Economic Affairs). (2015). World Population Prospects, the 2015 Revision (Population Division). Retrieved from <https://esa.un.org/unpd/wpp/>

<sup>51</sup> The World Bank Group. (2017). DataBank of the WorldBank. Retrieved from <http://databank.worldbank.org/data/>

<sup>52</sup> United Nations (Department of Social and Economic Affairs). (2015). World Population Prospects, the 2015 Revision (Population Division). Retrieved from <https://esa.un.org/unpd/wpp/>

<sup>53</sup> The World Bank Group. (2017). DataBank of the WorldBank. Retrieved from <http://databank.worldbank.org/data/>

<sup>54</sup> African Development Bank Group, OECD and UN. (2016). African Economic Outlook, Sustainable Cities and Structural Transformation.

As Bono, the singer of the well-known rock band U2 and a political activist committed with Africa, said in the 2017 Munich Conference of Security ‘If Nigeria fails, Africa fails’.<sup>55</sup>

The selection of Nigeria as a country for the study of trade-offs in health investments was in first place as mentioned before, its magnitude in Africa being the most populous and the largest economy of the continent. Secondly, for the numerous health investments made in the country and the significant incidence of malaria, HIV and malnutrition. And finally, because of the violent situation that the country is suffering which is aggravating the situation.

The selection of Ghana as a country of interest for the study was based in the previous decision. Ghana is a country close to Nigeria, and therefore suffers similar climate conditions. The incidence of these diseases in Ghana is also significant and the investments made are very large in comparison to its significance as a small country in Africa. The differences and similarities between both countries constituted a study based in an enriching comparison of the results of different politics, national and international, in the countries.

### **3. DATA AND METHODOLOGY**

We build up our analysis on two main databases, one for the health investments reported by the OECD credit report system and another one for the incidence of Malaria, HIV and Chronic Malnutrition by the WHO and the WB. In addition, another database has been used in order to retrieve the data of refugees by the UNHCR, as a complement to the analysis of Nigeria, where the conflict of Boko Haram is causing significant implications in health and health investments. Finally, an analysis of the macroeconomic indicators of the studied countries is given for a better understanding of the socioeconomic situation of the regions of interest.

#### **3.1. Donations Data**

The data used mainly in the section of Donations Data is extracted from the website of the OECD (Organization for Economic Co-Operation and Development), the OECD.Stat.<sup>56</sup>

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<sup>55</sup> Huete Machado, L., & Drummond, J. (2017, Febrero 23). Si Nigeria fracasa, África fracasa. El País. Retrieved from [http://elpais.com/elpais/2017/02/23/africa-no-es-un-pais/1487870323\\_187591.html](http://elpais.com/elpais/2017/02/23/africa-no-es-un-pais/1487870323_187591.html)

<sup>56</sup> OECD. (2016). OECD Stats. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>

The database includes a variety of data on different topics as for Economy, Agriculture, Development, Education, Energy, Environment, Finance and Government.

The selected variable for this study project has been Development, based on Development resource flows and Official Development Assistance (ODA). Concretely, this study analysis focuses on the individual project flows and Creditor Reporting System (CRS). As it is described in the OECD's website, *the objective of the CRS Aid Activity database is to provide a set of readily available basic data that enables analysis on where aid goes, what purposes it serves and what policies it aims to implement, on a comparable basis for all DAC members. Data are collected on individual projects and programs.*

In order to extract the data of interest several filters have been selected. Firstly, we have selected Official Development Assistance as main flow, All Channels of aid (Private Public Partnerships (PPP), Public Sector, NGOs, and Multilateral Organizations) and all types of aid (Project Type Interventions, Budget Support, etc.).

In addition, the data is expressed in constant prices, more concrete, in US Dollars of 2014. In the dataset, the amount of USD is represented in millions of USD<sub>2014</sub>, but in this project, we will mention thousands of USD<sub>2014</sub>. Moreover, the flow type selected is Gross Disbursements. This means that the amounts of the dataset are resources which have been distributed to a recipient country in a given year. The reasoning behind the selection of Gross Disbursements over Commitments is that the aim of the project is to extract conclusions based on the analysis of the investments really accomplished in the recipient country, not the committed ones.

The Regions of interest selected for the study of first, an overview of the developing world, and then, the country specific investments, are the following:

- |                   |                 |           |
|-------------------|-----------------|-----------|
| ○ Developing      | ○ Africa Total  | ○ Nigeria |
| ○ Countries Total | ○ America Total | ○ Ghana   |

In this project, we will study the main Health Investments in the selected countries and regions. Therefore, the different 'Sectors' selected in the dataset reflect this objective. Each sector defines the economic or social mission of the investments, the studied sectors are the following 4:

- 120. *I.2. Health, Total*: including both, general and basic health. In the section of General Health, we can find a variety of subsectors as for *Health Policy and Administration Management*, *Medical Education and Training*, *Medical Research* and *Medical Services*. Regarding the section of Basic Health, we find subsections as for *Basic Health Care*, *Basic Health Infrastructure*, *Basic Nutrition*, *Infectious Disease Control*, *Health Education*, *Malaria Control*, *Tuberculosis Control* and *Health Personnel Development*.

An important modification made for this specific study, with the objective of making more complete and accurate to reality this variable, is to sum up to the amount of investments Health Total the investments devoted to battle Sexually Transmitted Diseases (STD). Currently, this line item of investment has been crucial for the Aid of Development in Health Issues, and therefore it would not be accurate to talk about Health Total investments without including STD investments, mainly devoted to fight HIV. The variable used for this study is Health Total (including HIV/AIDS), of own elaboration.

- 12240. *Basic Nutrition*: Part of the Subsection of Basic Health in Health Total. This variable includes all investments made in order to guarantee the basic nutrition and nourishment of the population.

- 12262. *Malaria control*: Part of the Subsection of Basic Health in Health Total. This variable includes investments made in order to ensure the battle against this disease.

- 13040. *STD Control including HIV/AIDS*: Part of the Subsection of Population Policies/Programs & Reproductive Health Total. This variable includes the total amount of investments devoted to battle Sexually Transmitted Diseases (STD), the major part of the resources in this issue are devoted to fight against HIV, therefore we consider this variable as the referent variable for the battle against HIV.

The study uses data of the last 10 consecutive years from 2006 to 2015, both included.

### 3.2. Health Indicators

In the aim of gathering data for the incidence of the three main health issues studied, malaria, HIV and malnutrition, in Ghana and Nigeria, two databases were consulted: the dataset of the World Bank<sup>57</sup> and the World Health Organization dataset.<sup>58</sup>

This case study formulates the evolution of five health variables over a time-lapse of 10 years (2005-2015) with the intention of describing the incidence of these health issues regionally and in the two countries of interest, Nigeria and Ghana. As result of the use of two different databases, the regions used to explain a global situation of the health issue are slightly different. On the one hand, we find as regions of interests Sub-Saharan Africa, Latin-American & Caribbean and Low & Middle-Income Countries Total for some variables. On the other hand, we described as important regions Africa Total, America Total and Developing Countries Total for the remaining variables. The difference among them are minimal in the topic of incidence of these health problems (Malaria, HIV and Stunting) because those are mainly a developing countries' issue, therefore we can consider that they comparable among them, and also similar to the developing regions of the section for investments.

Developing Countries, Africa and Latin-America have been selected as regions of study in order to contextualize the incidence of the illnesses in the World. Even though our focus of study is Ghana and Nigeria in Africa, we obtain data from Africa in general (in addition to the data from Ghana and Nigeria) and we also obtain data Latin America as a region. Nonetheless, the selection of Latin America as a region of study has the objective of seeing from another angle the health issues covered in this study and compare the region of Africa to other developing regions of the world. Latin Americas is a more developed region than Africa, whose incidence in malaria, malnutrition and HIV is also significant. We use the data of Latin America in order to have it as a reference to other developing regions with the same health issues but with a different level of development.

The five health variables (Prevalence of stunting, malaria incidence, malaria n° of reported deaths, malaria n° of reported cases, HIV incidence) have been extracted primary from the

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<sup>57</sup> The World Bank Group. (2017). DataBank of the WorldBank. Retrieved from <http://databank.worldbank.org/data/>

<sup>58</sup> World Health Organization (WHO). (2016). Global Health Observatory data repository (GHO). Retrieved from <http://apps.who.int/gho/data/node.main>



two databases explained before, but in the case of malaria another source has been part of the project in order to complete the dataset, the Malaria Report of 2016, by the WHO.

- *Prevalence of stunting, height for age (% of children under 5)*: This measures the prevalence of child malnutrition as the percentage of children under age 5 whose height for age (stunting) is more than two standard deviations below the median for the international reference population ages 0-59 months. Two different sources of the World Bank DataBank have been used for this variable: the Subnational Malnutrition database for the regional data of Ghana and Nigeria and the Health Nutrition and Population Statistics for the national average data of both countries. In addition, with the dataset of the WHO information about Developing Countries, Africa and America was obtained.

- *Incidence of Malaria*: is the number of new cases of malaria in a year per 1,000 population at risk. The incidence of malaria was obtained from the World Development Indicators, one of the sources of the DataBank of the World Bank.

- *Malaria number of deaths*: Two different variables are showed in these graphs, the number of reported deaths and the number of estimated deaths due to malaria in a given year, with a significant difference among them, mainly due to the lack of reporting deaths. In poor countries as the ones studied the reporting indexes are very low and even lower when it refers to the cause of death.

- *Malaria number of cases*: as in the case of malaria deaths, two different variables are showed in these graphs, the number of reported cases and the number of estimated cases of malaria in a given year, with a significant difference among them, mainly due to the low reporting indexes and the lack of resources.

For the previous variables, numbers of deaths and cases of malaria, two datasets have been used. Firstly, for the number of reported cases and deaths the main source of information was the DataBank of the WorldBank (Health, Nutrition and Population Statistics; Africa Development Indicators) and it was completed with the Malaria Report 2016 edited by the WHO and the WHO dataset. On the other hand, the estimations about the number of malaria cases and deaths were obtained by a unique source the WHO dataset, which included estimations for the margins of error, represented in the graph. The estimations are for three specific years 2005, 2010 and 2013; and only for the two countries of interest Ghana and Nigeria.

- *Incidence of HIV (% of uninfected population ages 15-49)*: Number of new HIV infections among uninfected populations' ages 15-49 expressed as percentage. It was obtained from the Health, Nutrition and Population Statistics' source of the WorldBank's DataBank.

### 3.3. Refugees and IDPs

In addition, I considered the information of refugees and IDPs of Nigeria due to the current violent situation with the Boko-Haram's conflict in the North-East part of the country. I realized during my study that the most violent areas of the country were suffering a striking situation of malnutrition jointly with the adjoining countries of asylum as Niger, Cameroon and Chad. The purpose of including this new variable to the study is to see if the investments made in malnutrition matched with the critical situation that the area is suffering.

Therefore, the information about the refugees and Internally Displaced Persons has been an additional part of interest for this project. Two main sources have been used for this purpose the Statistics Database of the United Nations Refugee Agency (UNHCR) in Spain called ACNUR<sup>59</sup> and the 2015 Revision of World Population Prospects by the Department of Economics & Social Affairs of the United Nations.<sup>60</sup>

The variables of interest for this analysis were two, the number of Nigerian refugees and IDPs and its places of asylum, both retrieved from the UNHCR' Statistics Database, with data of 2015.

- *Nigerian refugees, asylum-seekers, internally displaced persons (IDPs), returnees (refugees and IDPs), stateless persons, and others of concern to UNHCR, end-2015*

In this database, we can find information about asylum-seekers, refugees, IDPs and others in the year ended 2015. The UNHCR provides the following descriptions about the main variables used in this study (refugees and IDPs):

- Refugees “include individuals recognized under the 1951 Convention relating to the Status of Refugees; its 1967 Protocol; the 1969 OAU Convention Governing the Specific Aspects of Refugee Problems in Africa; those recognized in accordance with

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<sup>59</sup> UNHCR, the UN Refugee Agency. (2015). Population Statistics. Retrieved from [http://popstats.unhcr.org/en/overview#\\_ga=1.220600017.851890232.1491413062](http://popstats.unhcr.org/en/overview#_ga=1.220600017.851890232.1491413062)

<sup>60</sup> United Nations (Department of Social and Economic Affairs). (2015). World Population Prospects, the 2015 Revision (Population Division). Retrieved from <https://esa.un.org/unpd/wpp/>

the UNHCR Statute; individuals granted complementary forms of protection; or those enjoying temporary protection”.

- Internally displaced persons (IDPs) “are people or groups of individuals who have been forced to leave their homes or places of habitual residence, in particular as a result of, or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights, or natural or man-made disasters, and who have not crossed an international border”.

Therefore, the Table 6 (*Annex 3*) includes information of 2015 about the number of Nigerian refugees (broken down in refugees, refugees-like situations, assisted by the UNHCR and asylum seekers-pending cases); IDPs and others of concerned.

- *Nigerian refugees and people in a refugee-like situation, excluding asylum-seekers, and changes by country of asylum, 2015*, the countries of asylum for Nigerians in 2015 were the following:

- |            |         |
|------------|---------|
| ○ Cameroon | ○ Italy |
| ○ Canada   | ○ Niger |
| ○ Chad     | ○ UK    |
| ○ France   |         |

Table 7 (*Annex 3*) gives two different points of information: the number of Nigerian refugees at the beginning of 2015 and at the end of 2015 by country of asylum, and it also includes the number of refugees of those that were assisted by the foundation.

In addition, as a complement for the variables defined above, inside the other UN’s database mentioned before, an historic of Nigerian migrants from 1990-2013 by place of asylum was recovered in order to have a broader mind of the situation.

- *Total migrant stock at mid-year of Nigeria by major area, region, country or area of destination, 1990 – 2013*, which principal areas and regions of study are the following:

- |                          |                         |
|--------------------------|-------------------------|
| ○ More developed regions | ○ Africa (North, South, |
| ○ Less developed regions | East, West, Middle      |
| ○ Sub-Saharan Africa     |                         |

The data is represented as number of total migrants in each region/area, and also as the percentage that these migrants represent for the total migrants of the year of study. For instance, in 2000 there were 625.993 Nigerian migrants all over the world, from which

279.818 went to Sub-Saharan Africa, which represents a 45,18% of total Nigerian migrants (Table 8, Annex 3).

### **3.4. Development Indicators**

In this last section, some relevant indicators are presented for the regions and countries of interest. The purpose is to give a general socioeconomic overview of the current context for each country. The source used in order to retrieve the figures was the 'World Development Indicators' of the World Bank DataBank.

The indicators chosen are the following:

- GDP per capita PPP (constant 2011 International \$): the GDP per capita based on purchasing power parity (PPP). PPP rates convert into international dollars the GDP. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States.
- GDP growth (annual %): GDP's annual percentage growth at market prices.
- Population, total (in millions): total residents in the country regardless of legal status or citizenship.
- Population growth (annual %)
- Mortality rate, under 5 (per 1,000 live births): the probability per 1,000 that a newborn baby will die before reaching age five.
- Life expectancy at birth, total (years): the number of years a newborn infant would live (according to the mortality patterns at the time of its birth).

The data presented is available for the years 2006 and 2015, both included, and for the following areas: Middle & Low Income Countries, Sub-Saharan Africa, Latin America & Caribbean, Nigeria and Ghana.

The tables showed in the following page are of own elaboration from data of the World Bank's DataBank (<http://databank.worldbank.org/data/>).

Table 1. Development indicators 2006-2015

Middle & Low Income Countries	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	6483,10	6957,70	7255,75	7371,15	7828,89	8185,52	8482,10	8798,30	9090,40	9349,44
GDP growth (annual %)	8,09%	8,68%	5,69%	2,37%	7,54%	5,99%	4,88%	4,95%	4,31%	3,72%
Population growth (annual %)	1,34%	1,32%	1,32%	1,32%	1,32%	1,32%	1,32%	1,32%	1,32%	1,30%
Population, total, millions	5474,18	5546,49	5619,63	5693,95	5769,21	5845,58	5922,88	6001,16	6080,18	6159,44
Mortality rate, under-5 (per 1,000 live births)	66,30	63,70	61,50	58,90	56,90	54,30	52,00	49,90	48,00	46,40
Life expectancy at birth, total (years)	67,36	67,69	68,00	68,32	68,61	68,91	69,19	69,44	69,68	..
Sub-Saharan Africa	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	2928,82	3051,32	3132,80	3149,07	3238,42	3292,91	3326,47	3399,69	3470,52	3488,27
GDP growth (annual %)	7,05%	7,07%	5,39%	2,85%	5,39%	4,32%	3,72%	4,76%	4,59%	3,01%
Population growth (annual %)	2,74%	2,76%	2,77%	2,77%	2,77%	2,77%	2,77%	2,76%	2,75%	2,73%
Population, total, millions	783,40	805,00	827,20	850,20	873,80	898,00	922,80	948,30	974,40	1000,90
Mortality rate, under-5 (per 1,000 live births)	121,71	116,32	111,12	106,16	101,40	97,08	93,02	89,36	86,06	83,18
Life expectancy at birth, total (years)	53,43	54,18	54,93	55,65	56,33	56,97	57,55	58,08	58,56	..
Latin America & Caribbean	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	12700,35	13256,38	13602,96	13194,67	13795,65	14239,62	14485,04	14732,91	14716,77	14596,57
GDP growth (annual %)	5,32%	5,71%	3,98%	-1,73%	5,80%	4,38%	2,83%	2,78%	0,74%	-0,29%
Population growth (annual %)	1,29%	1,27%	1,25%	1,22%	1,20%	1,17%	1,15%	1,12%	1,09%	1,07%
Population, total, millions	570,05	577,27	584,50	591,60	598,70	605,70	612,60	619,51	626,29	633,00
Mortality rate, under-5 (per 1,000 live births)	23,66	22,76	21,93	21,18	23,66	19,87	19,30	18,78	18,35	17,96
Life expectancy at birth, total (years)	73,15	73,38	73,60	73,82	74,04	74,26	74,49	74,71	74,94	..
Nigeria	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	4352,80	4528,86	4686,61	4879,48	5122,81	5230,60	5309,52	5447,76	5639,45	5638,89
GDP growth (annual %)	8,21%	6,83%	6,27%	6,93%	7,84%	4,89%	4,28%	5,39%	6,31%	2,65%
Population growth (annual %)	2,62%	2,64%	2,66%	2,67%	2,68%	2,69%	2,69%	2,68%	2,66%	2,63%
Population, total, millions	143,32	147,15	151,12	155,21	159,42	163,77	168,24	172,82	177,48	182,20
Mortality rate, under-5 (per 1,000 live births)	152,20	146,40	140,90	135,50	130,30	125,50	120,90	116,60	112,50	108,80
Life expectancy at birth, total (years)	49,24	49,81	50,36	50,87	51,33	51,74	52,11	52,44	52,75	..
Ghana	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP per capita, PPP (constant 2011 international \$)	2651,39	2695,88	2867,72	2930,95	3083,87	3430,86	3659,24	3833,79	3894,00	3954,52
GDP growth (annual %)	6,40%	4,35%	9,15%	4,85%	7,90%	14,05%	9,29%	7,31%	3,99%	3,92%
Population growth (annual %)	2,60%	2,59%	2,58%	2,55%	2,52%	2,48%	2,44%	2,40%	2,35%	2,30%
Population, total, millions	21,95	22,53	23,12	23,71	24,32	24,93	25,54	26,16	26,79	27,41
Mortality rate, under-5 (per 1,000 live births)	84,40	82,20	79,90	77,40	74,70	71,90	69,20	66,50	64,00	61,60
Life expectancy at birth, total (years)	59,18	59,64	60,03	60,36	60,61	60,81	60,98	61,14	61,31	..

## 4. INVESTMENTS AND INCIDENCE: A COMPARATIVE ANALYSIS

This section is devoted to see the evolution of health investments made and the incidence of the researched diseases in the countries of interest and worldwide regions.

### 4.1. Regions of Study

Nigeria and Ghana are countries where the incidence of diseases as malaria, malnutrition and HIV is significant, and many efforts have been made in order to ameliorate the situation. NGOS, Governmental Institutions, individual volunteers; have invested their time and their economic resources in those countries for making civilians' life better. In fact, international health investments summed up 810 million USD<sub>2014</sub> in Nigeria and 156 million USD<sub>2014</sub> in Ghana during 2015.<sup>61</sup>

Nigerian health investments represented in 2015 the 11% of total health investments in Africa and more than the 6% of total health investments in Developing Countries. The figure is even more significant when talking about malaria investments, in 2015 the 14% of the money invested in Africa and almost the 12% of the investments in developing countries in malaria were for Nigeria. Nevertheless, the figures are less impressive referring to basic nutrition investments, Nigeria represented in 2015 only a 3% of the African investments and less than a 2% of Developing Countries' investments in this issue. As for investments in Sexually Transmitted Diseases (STD), where HIV is the principal component, Nigerian investments represented in 2015 the 10% and the 6% of the investments for this purpose in Africa and Developing Countries respectively (*Annex 1: Table 4 & Table 5*).<sup>62</sup>

In the case of Ghana, health investments represented in 2015 a 2% and 1% of total health investments in Africa and Developing Countries respectively. The percentages are 6% and 5% when they are referred to malaria investments. In the case of Ghana, the investments made in Basic Nutrition are higher than the ones made in STD Control, but both lower than malaria investments. Ghanaian investments in STD Control did not reach the 1% of Developing Countries' investments in this issue in 2015, and were the 1% of African investments. Regarding basic nutrition investments, in 2015 the 2% of the money invested in Africa and the 1% of the investments in developing countries were for Ghana (*Annex 1:*

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<sup>61</sup> OECD. (2016). OECD Stats. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>

<sup>62</sup> OECD. (2016). OECD Stats. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>

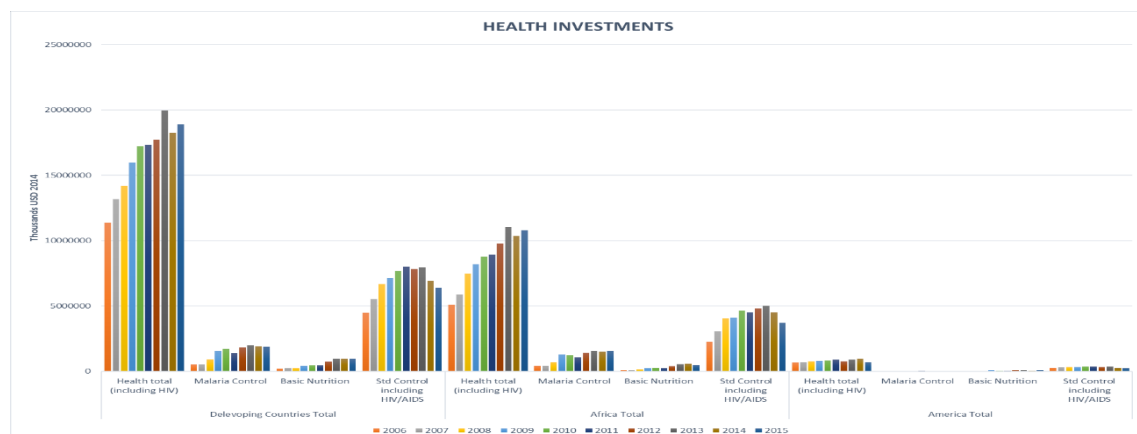
Table 4 & Table 5).<sup>63</sup> During the following sections we will see the evolution of both the health incidence and the health investments made in the regions of study.

## 4.2. Evolution of Donations

### 4.2.1. A World Overview

As we can derive from Figure 1, Health investments have increased during the period 2006-2015 in Developing Countries as an average, but also in Africa; whereas the American investments have been more stable along time. We can see a peak in total health investments in 2013 for Developing Countries and Africa; while in America the peak happened two years before in 2011. The trend followed by African health investments is very similar to the one of Developing Countries, in fact, both regions focused first on STD Control (including HIV/AIDS) and afterwards in Malaria, leaving Basic Nutrition in the third place. On the other hand, in America the second and third places are interchanged. In addition, Africa is the developing region where most of the investments go during the whole period. In fact, approximately half of total health investments in the developing world are made in Africa and the number is even higher when it refers to Malaria investments where the average is almost an 80% and STD control where it comes upon the 60%. The investments made in America are residual in comparison, with the highest number in Basic Nutrition investments, which round the 10% of total developing countries' investments in average for the period selected, nonetheless Africa's figure is higher in nutrition too surpassing the 50% of average.

Figure 1. Health Investments 2006-2015, a World Overview



Source: Own elaboration based on data from the OECD's Statistics, CRS  
<https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>

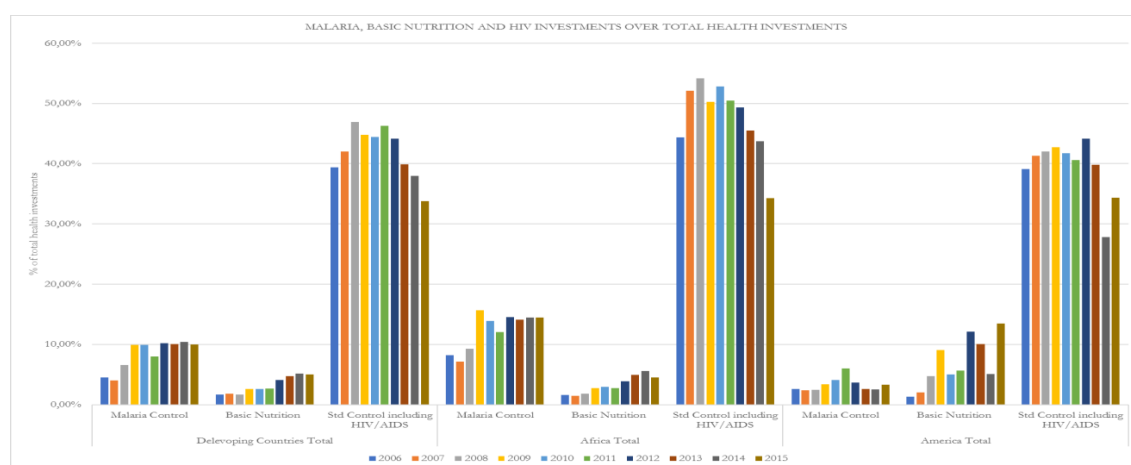
<sup>63</sup> OECD. (2016). OECD Stats. Retrieved from <https://stats.oecd.org/Index.aspx?DataSetCode=CRS1>

As for the portion that the investments made in the different regions in malaria, HIV and basic nutrition represent as part of the total health investments made, we can see in Figure 2 that HIV investments are the ones with the highest proportion in the three regions, but with a decreasing trend among the years of study (2006-2015). In Developing countries and America, HIV investments round in average the 40% of total health investments, whilst in Africa the number is even higher, approximately the 50%.

Regarding malaria control investments, we observe an increasing trend in the three regions, nonetheless the investments have been stagnated or have decrease in the case of America since the middle of the period (2011-2012). The portion that the malaria investments represent as total investments is much lower if we compare it to HIV investments. In fact, malaria investments represent an 8%, 12% and 3% on average to total health investments in developing countries, Africa and America respectively.

In terms of basic nutrition investments, there is an increasing trend over time, with a high fluctuation in America. Basic nutrition investments represent a 3%, 3% and 7% on average to total health investments in developing countries, Africa and America respectively.

Figure 2. Malaria, Basic Nutrition and HIV Investments over Total Health Investments 2006-2015, a World Overview



Source: Own elaboration based on data from the OECD's Statistics, CRS  
<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>

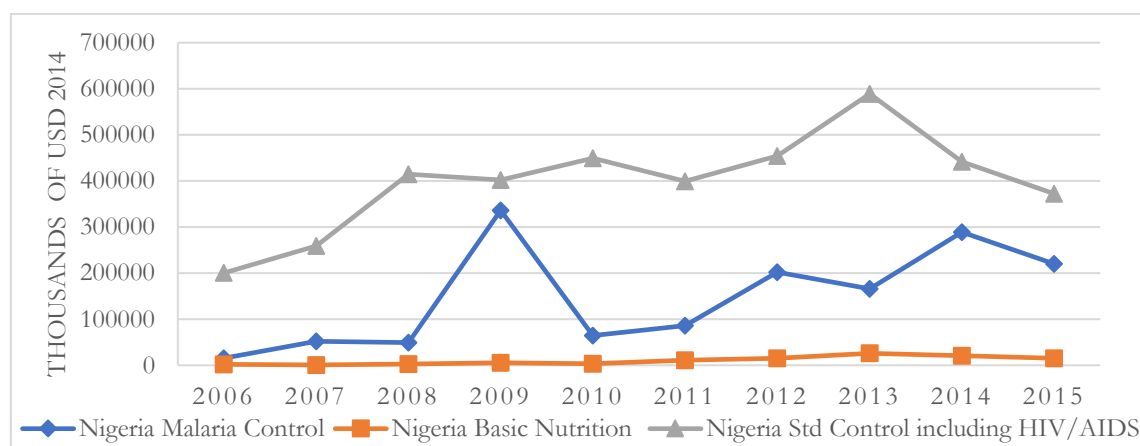
For more information see Annex 6, where a more detailed situation of health investments worldwide is provided in different figures and tables.



#### 4.2.2. Nigeria

Nigerian health investments have also followed the pattern of African health investments, see Figure 3, where STD Control (including HIV/AIDS) is the most financed disease, followed by malaria investments, while the investments made in basic nutrition are insignificant in comparison. In addition, we observe a positive pattern in the investments of the three main diseases of study from 2006 to 2015, with some variability, as for the peak in malaria investments from \$<sup>2014</sup>49 million in 2008 to \$<sup>2014</sup>336 million in 2009 and to \$<sup>2014</sup>64 million in 2010.

Figure 3. Nigerian Health Investments 2006-2015 (thousands of 2014 USD)

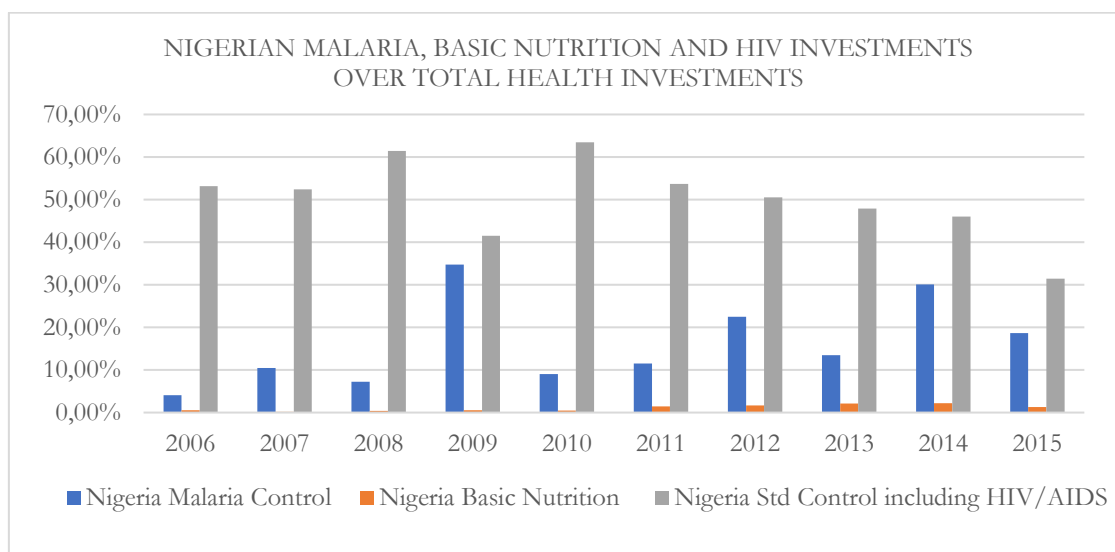


Source: Own elaboration based on data from the OECD's Statistics, CRS

(<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Investments in STD Control (including HIV/AIDS), mainly devoted to battle HIV; have increased from \$<sup>2014</sup>200 million in 2006 to \$<sup>2014</sup>372 million in 2015; which account for the 53% and 32% of the total health investments respectively. The decreasing presence of HIV as part of total health investments as seen in Figure 4, has to do with the fact that donations in other areas of health are being made, as for malaria. As for investments in Malaria Control, they have increased from \$<sup>2014</sup>52 million in 2006 to \$<sup>2014</sup>220 million in 2015, representing the 4% and 19% of total health investments made in Nigeria respectively. Finally, regarding investments in Basic Nutrition, we can observe that they have increased from \$<sup>2014</sup>2 million in 2006 to \$<sup>2014</sup>15 million in 2015, doubling its presence as part of total health investments, from 0.6% to 1.3% respectively.

Figure 4. Nigerian Health Investments 2006-2015 (% of Total Health Investments)



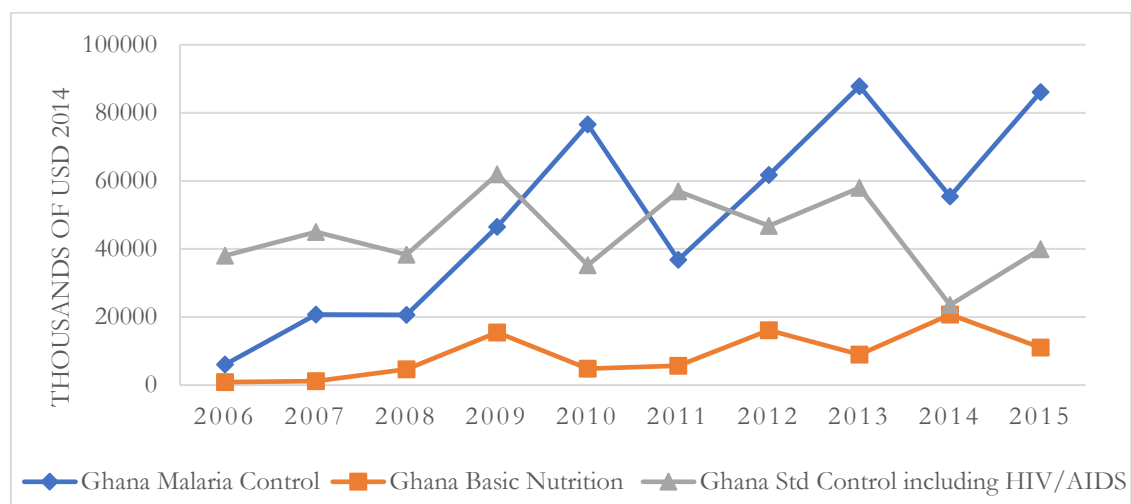
Source: Own elaboration based on data from the OECD's Statistics, CRS  
<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>

To conclude, Nigerian investments in health focused at first in the battle against HIV and AIDS, even though HIV is still the major health investment made in Nigeria, malaria control is increasing its presence too, while basic nutrition investments against stunting were and still are minimal in the country. (Figures 3 and 4)

#### 4.2.3. Ghana

Ghanaian health investments have followed a different pattern to the one of African health investments and Nigeria, see Figure 5. In Ghana, STD Control (including HIV/AIDS) was at first the most financed disease until 2009 where malaria investments took the lead. In addition, investments made in basic nutrition were and still are in third position, but the disbursement is higher. The variability in Ghanaian health investments is very high, and we can see a periodic pattern of around two years in the ups and downs. From 2006 to 2015, the trend in malaria investments and basic nutrition investments is positive, whereas the trend in STD Control is flat, as seen in figure 5.

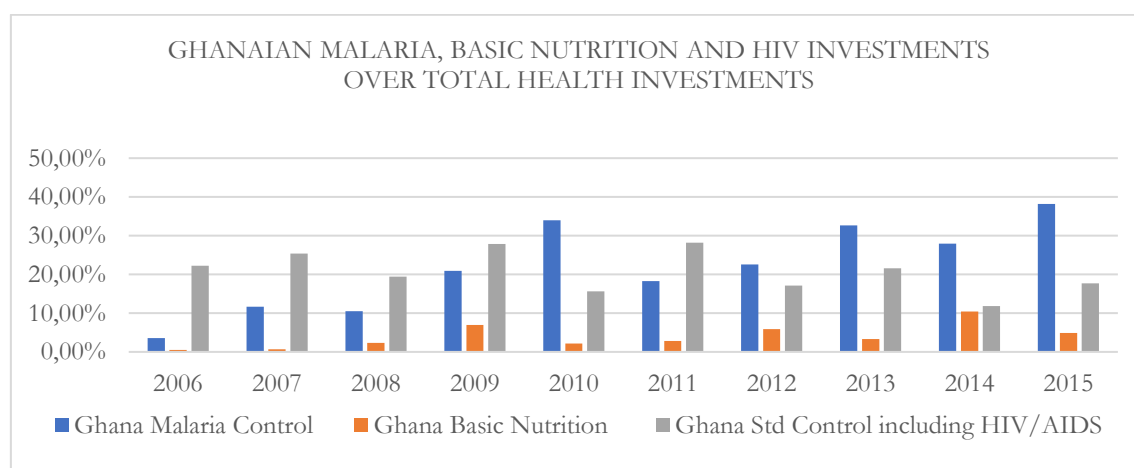
Figure 5. Ghanaian Health Investments 2006-2015 (Thousands of 2014 USD)



Source: Own elaboration based on data from the OECD's Statistics, CRS  
<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>

Investments in STD Control (including HIV/AIDS), mainly devoted to battle HIV; have remained similar from \$<sup>2014</sup>38 million in 2006 to \$<sup>2014</sup>40 million in 2015; which account for the 22% and 18% of the total health investments respectively. As for investments in Malaria Control, they have increased from \$<sup>2014</sup>6 million in 2006 to \$<sup>2014</sup>86 million in 2015, representing the 3,5% and 38% of total health investments made in Nigeria respectively. Finally, regarding investments in Basic Nutrition, we can observe that they have increased from \$<sup>2014</sup>0,9 million in 2006 to \$<sup>2014</sup>11 million in 2015, multiplying its presence as part of total health investments, from 0.5% to 5% respectively.

Figure 6. Ghanaian Health Investments 2006-2015 (% of Total Health Investments)



Source: Own elaboration based on data from the OECD's Statistics, CRS  
<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>

To conclude, Ghanaian health investments in health focused at first in the battle against HIV and AIDS until 2009. Malaria control is the leading cause of health investments in the country, while basic nutrition investments against stunting were minimal and are increasing its presence and budget (Figures 5 and 6).

### 4.3. Evolution of Incidence

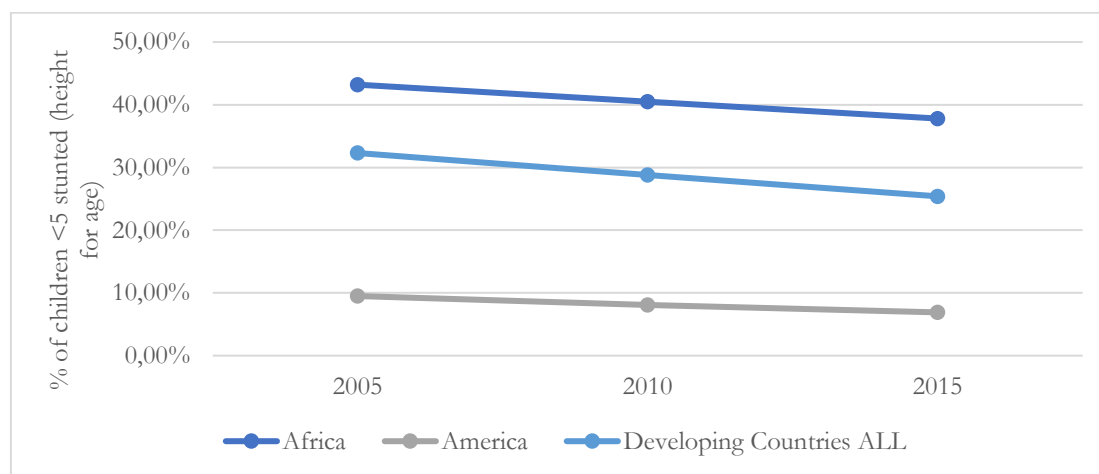
#### 4.3.1. A World Overview

##### 4.3.1.1. Malnutrition

In developing countries, there is a decreasing trend in the incidence of child malnutrition, more concrete in the proportion of stunted children under five years old, as we can see in Figure 7 (grey line). In fact, there is a decrease of almost a 7% from 2005 to 2015.

Africa and America follow the same decreasing trend as Developing Countries, but the numbers are quite different. Africa is above the incidence of developing countries during the whole period with numbers rounding the 40% of stunted children; whereas America is quite below, with numbers approaching the 10% of stunted children and lower.

Figure 7. Child Malnutrition Incidence 2005-2015, a World Overview (% of stunted children <5)



Source: Own elaboration based on data from the World Health Organization's dataset, the Global Health Observatory (GHO) data (<http://apps.who.int/gho/data/node.home>)

##### 4.3.1.2. Malaria

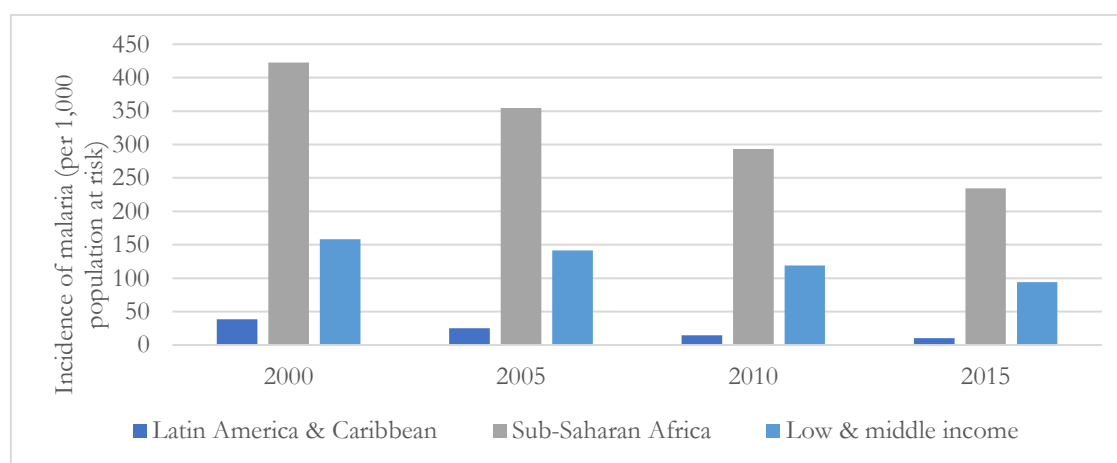
As for malaria incidence, the same pattern as basic nutrition incidence is followed, as shown in Figure 8. In this case, we measure the incidence of malaria per 1,000 population at risk. Sub-Saharan Africa is the region with the highest incidence during the whole period, from

2000 to 2015, from more than 400 to less than 250 new people infected per 1,000 population at risk respectively; which represents almost a 45% decrease in fifteen years.

The incidence of malaria in 'Low & middle-income countries' is much smaller, from more than 150 to less than 100 new people infected per 1,000 population at risk in 2000 and 2015 respectively. Africa's incidence in malaria was 2.7 times greater than Low & middle-income countries incidence; this number diminished to 2.5 in 2015.

As for the incidence of malaria in Latin American & Caribbean, is minimal, as seen in Figure 8. In fact, the incidence does not arrive to 40 in 2000, and rounds 10 in 2015.

Figure 8. Malaria Incidence 2000-2015, a World Overview (per 1,000 population at risk)



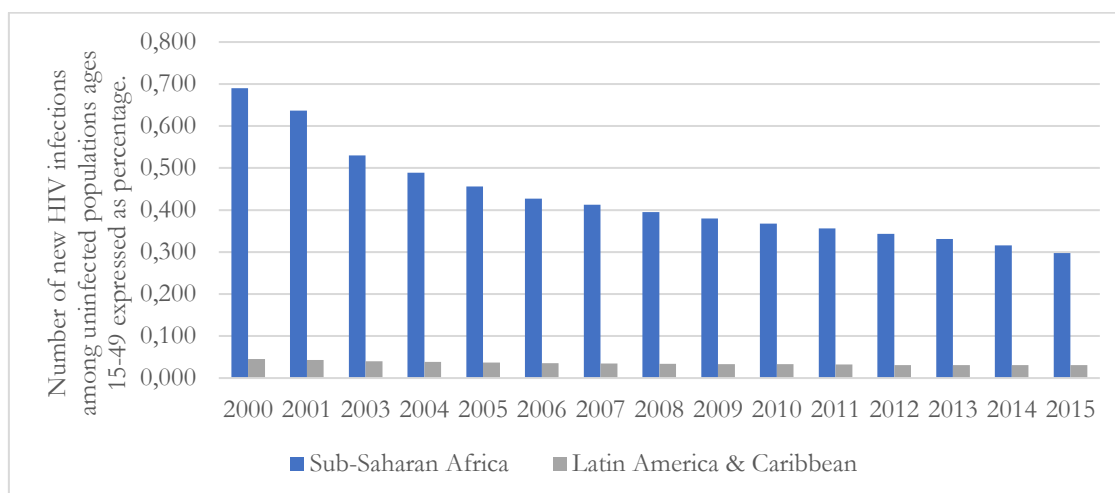
Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>)

#### 4.3.1.3. HIV

HIV incidence is measured by the number of new infections among uninfected population of 15 to 49 years old expressed as percentage. As we can derive from Figure 9, HIV incidence in Sub-Saharan Africa is very high in comparison to Latin American & Caribbean. In Africa in 2000, 0.69 %, this means that there were 0.69 new infections over 100-uninfected population from 15 to 49 years old. This number diminishes along time by more than half, until the 0.30% of 2015.

The trend followed by Latin America and Caribbean in HIV incidence is slightly different; it also has a decreasing slope, but is flatter over time. From 0.046% to 0.031% during 2000 and 2015 respectively.

Figure 9. HIV Incidence 2000-2015, a World Overview (% of infected population ages 15-49)



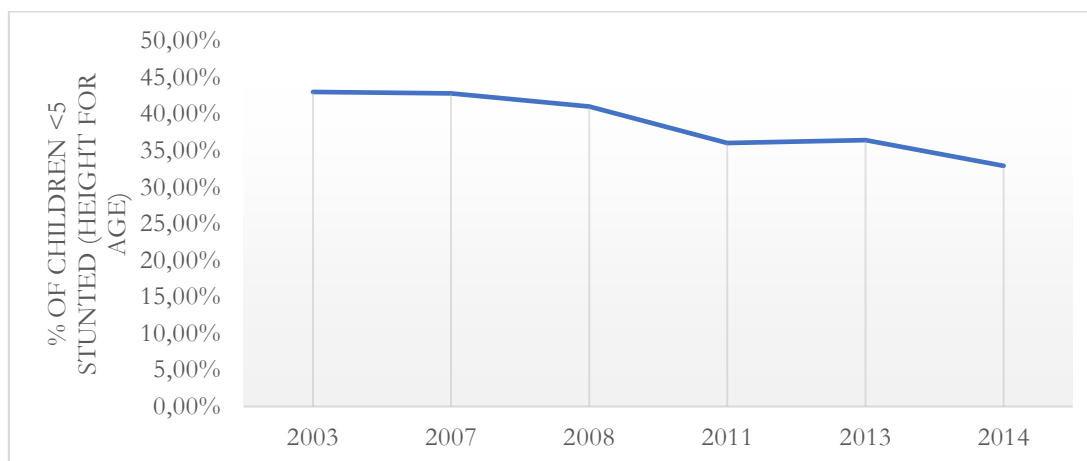
Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>)

#### 4.3.2. Nigeria

##### 4.3.2.1. Malnutrition

The proportion of Nigerian stunted children follows the African example, with a decreasing trend over time, but with a still high rate nowadays. In fact, as we can see in Figure 10, 43% of Nigerian children under 5 years old were stunted in 2003, similar to the 40% of 2005 in Africa as a whole. The number has improved, arriving to a 33% of stunting incidence in 2014, a 10% less in 11 years.

Figure 10. Nigerian Child Malnutrition Incidence 2003-2014 (% of stunted children <5)



Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>)

Nonetheless, there are significant differences among the stunting incidence in the different regions of the country. As derived from Table 2, the regions with the lowest incidence are in the Southern part of the country, with its lowest rate in the South-East Zone that in 2014

was only 11%; extremely low compared to the 33% of national average. On the other hand, the Northern regions are the ones with the highest rates of stunting, specially the North-West Zone where the stunting rate arrived to a 52.7% of children under 5 in 2014 and it was even higher before with almost 60% of under 5 children stunted in 2003.

Table 2. Nigerian Prevalence of Stunting by Regions 2003-2014 (% of children <5)

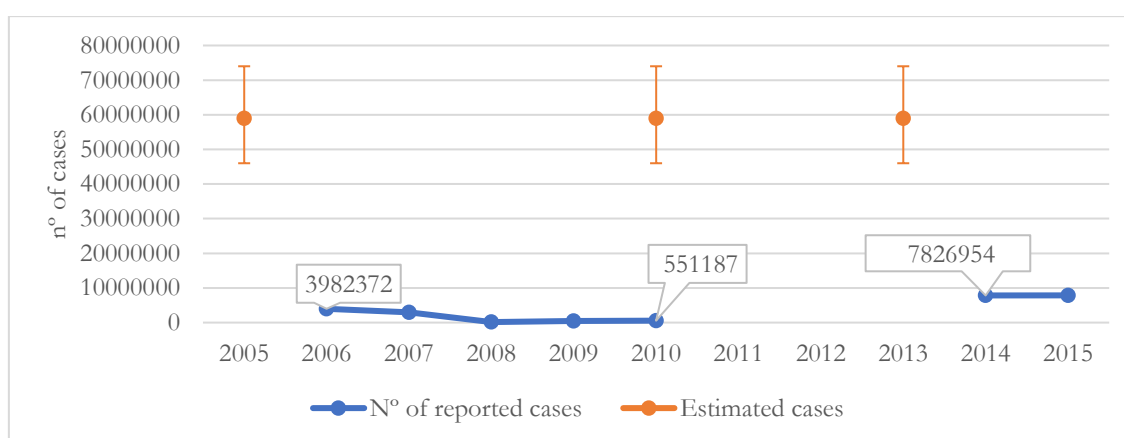
PREVALENCE OF STUNTING, HEIGHT FOR AGE (% OF CHILDREN UNDER 5)				
	2003	2008	2013	2014
Nigeria, South South Zone	28	32,8	18,6	20,8
Nigeria, South West Zone	28,4	32,2	22,4	21,1
Nigeria, South East Zone	20,3	24,2	16,3	11
Nigeria, North Central Zone	34,6	44,5	29,3	29,3
Nigeria, North West Zone	59,7	51,2	53,5	52,7
Nigeria, North East Zone	47,4	46,9	40,3	48,7

Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>)

#### 4.3.2.2. Malaria

Malaria incidence in Nigeria is very high, with around 60 million of estimated cases in 2013, as seen in Figure 11. There is a significant difference with the number of estimated cases versus the reported ones, but it is diminishing over time. In 2014, only the 13% of the estimated cases was reported, this has to do with the fact that the Administration is not recording an exhaustive list of the cases and also that the diagnosis might be inaccurate, for a lack of it or for the lack of resources.

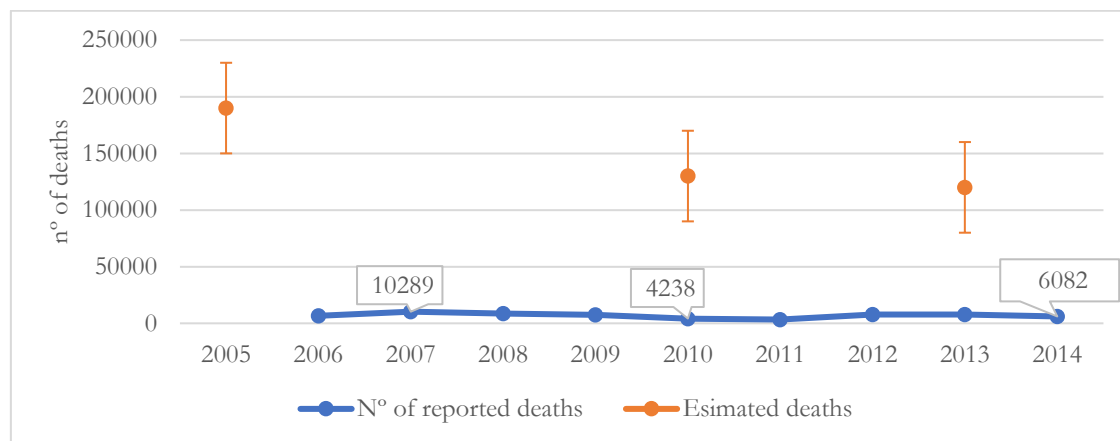
Figure 11. Nigerian Malaria Incidence 2005-2015 (n° cases)



Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>), the World Health Organization dataset (GOH) (<http://apps.who.int/gho/data/node.home>) and the 2016 Malaria Report by the WHO

The same situation arises with the number of malaria deaths, as shown in Figure 12. The estimated trend is decreasing over time. The number of estimated malaria deaths in 2013 was of approximately 120 thousand, from which only the 7% were reported.

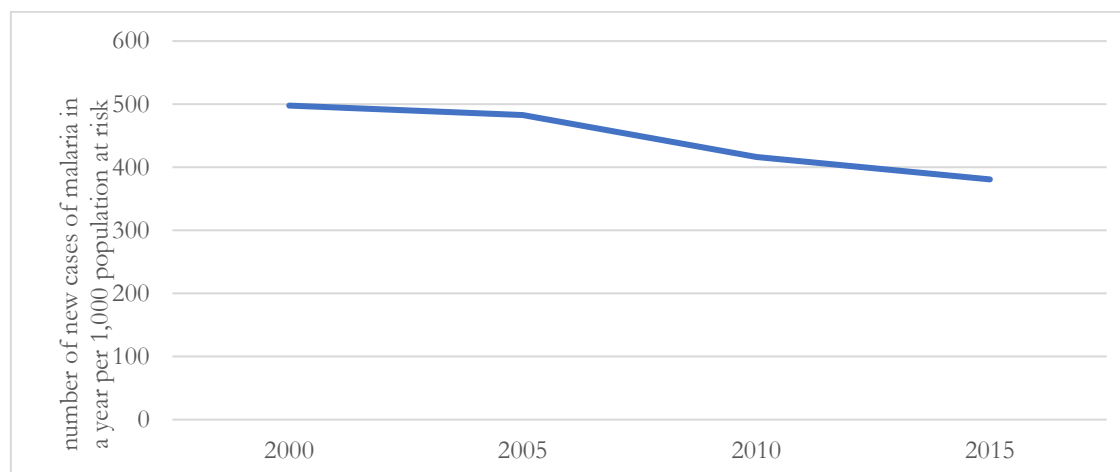
Figure 12. Nigerian Malaria Incidence 2005-2014 (n° of Deaths)



Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>), the World Health Organization dataset (GOH) (<http://apps.who.int/gho/data/node.home>) and the 2016 Malaria Report by the WHO

Moreover, the incidence of malaria in Nigeria has registered a flat decrease from 2000 to 2015. Actually, the number of new malaria cases per 1,000 population at risk decreased from almost 500 new cases to 380 in the period of study, as described in Figure 13.

Figure 13. Nigerian Malaria Incidence 2000-2015 (new cases per 1,000 population at risk)



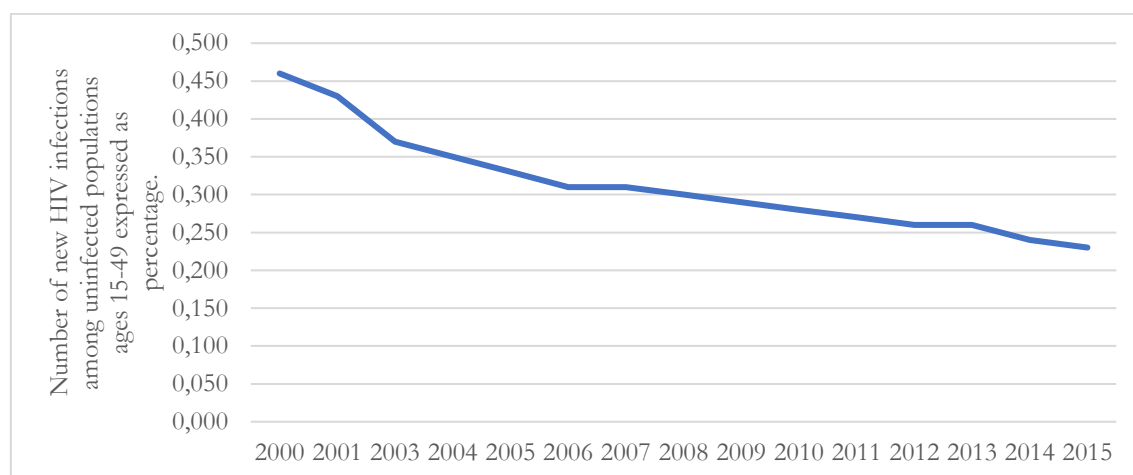
Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>)



#### 4.3.2.3. HIV

Concerning Nigerian HIV incidence, we can see the sharply decrease obtained from 2000 to 2015 in Figure 14. In fact, in 2000, Nigerian incidence was 0.46% versus the 0.69 % of African incidence of HIV. In 2000, there were 0.46 new infections in Nigeria over 100-uninfected population from 15 to 49 years old. The number diminishes by half, arriving to the 0.23% of 2015.

Figure 14. Nigerian HIV Incidence 2000-2015 (% of infected population ages 15-49)



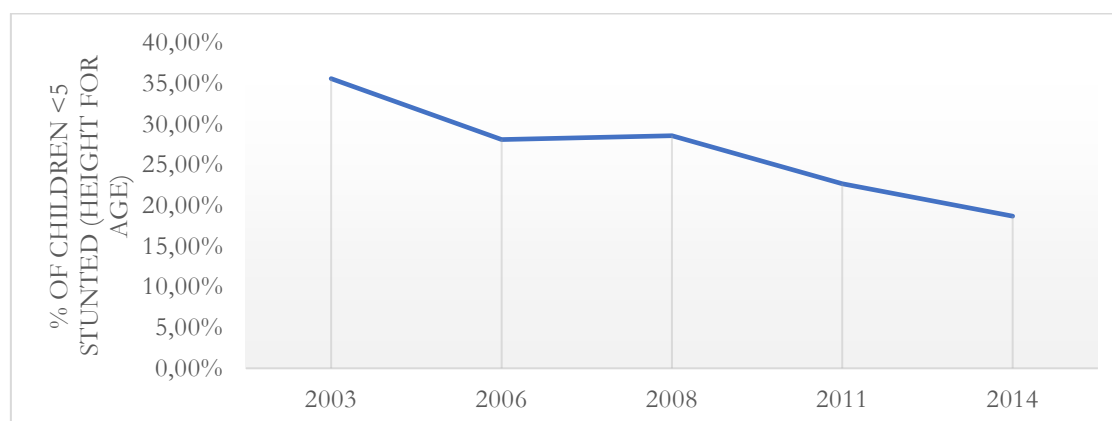
Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>)

#### 4.3.3. Ghana

##### 4.3.3.1. Malnutrition

Ghanaian stunting prevalence is decreasing with time, as seen in Figure 15, where more than 35% of Ghanaian children under five were stunted in 2003, compared to the 18.7% in 2014.

Figure 15. Ghanaian Child Malnutrition Incidence 2003-2014 (% of stunted children <5)



Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>)

Even though the prevalence of stunting is decreasing over time in all the regions of the country, there exist differences among them, which are expressed in Table 3. As a matter of fact, the Northern part of the country is the one with the highest prevalence of stunting, a 37.4% in 2011 higher to the national average of 22.7%. The zone with the lowest stunting incidence is Eastern Ghana, with 21.3% of prevalence in 2011.

Table 3. Ghanaian Prevalence of Stunting by Regions 2003-2011(% of children <5)

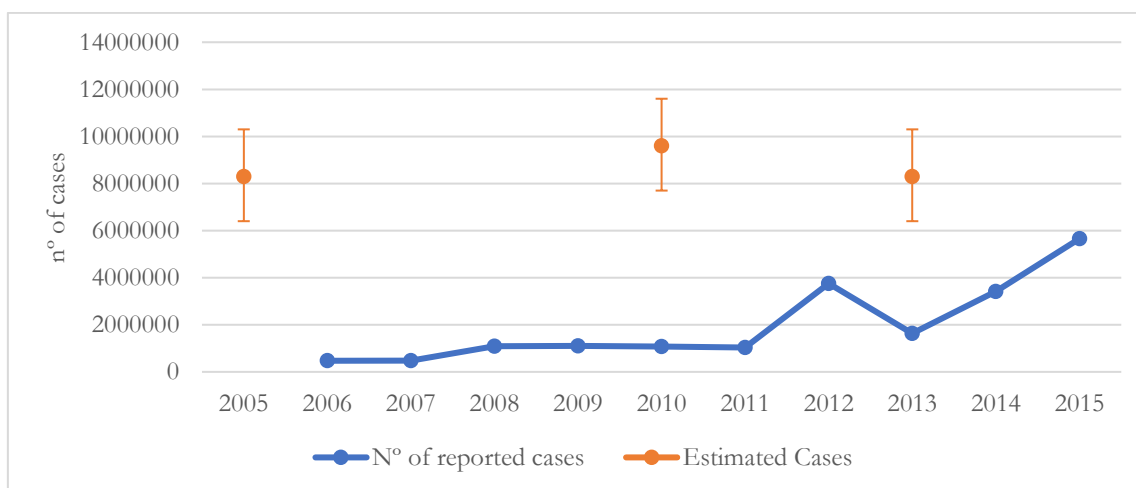
PREVALENCE OF STUNTING, HEIGHT FOR AGE (% OF CHILDREN UNDER 5)				
	2003	2006	2008	2011
Ghana, Central	38,1	33,7	33,9	23,1
Ghana, Eastern	33,2	28,4	39,3	21,3
Ghana, Western	33,4	27,4	26	22,6
Ghana, Northern	54	36,9	32,8	37,4

Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>)

#### 4.3.3.2. Malaria

As in the case of Nigeria, Ghanaian reported cases of malaria are scarce, but the Administration is improving it as we can see in Figure 16, where there is a sharp increase in the number of reported cases from 2006 to 2015. In addition, we can observe that the estimated cases increased from 2005 to 2010, and later decreased in the same proportion from 2010 to 2015, leaving the period estimations unchanged in 8.3 million cases in 2013, from which only a 20% were reported.

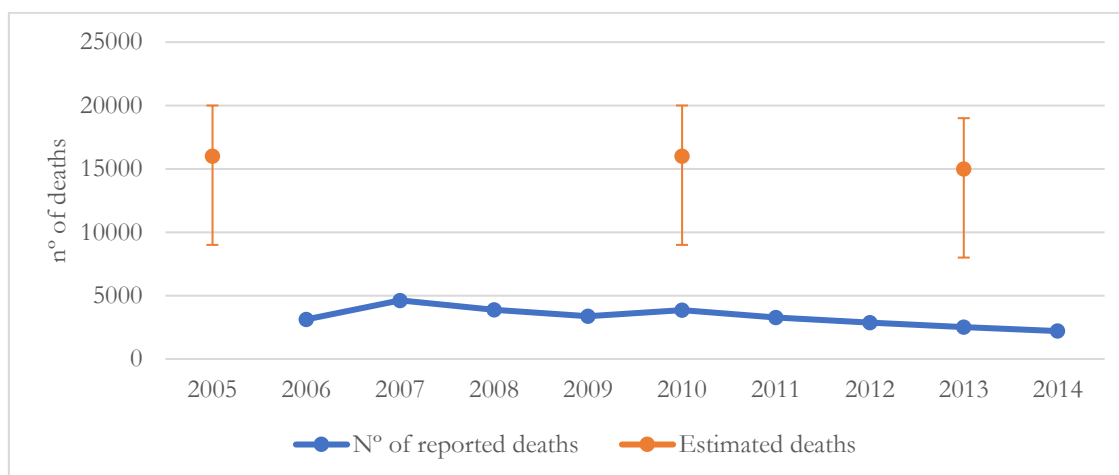
Figure 16. Ghanaian Malaria Incidence 2005-2015 (n° of cases)



Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>), the World Health Organization dataset (GOH) (<http://apps.who.int/gbo/data/node.home>) and the 2016 Malaria Report by the WHO

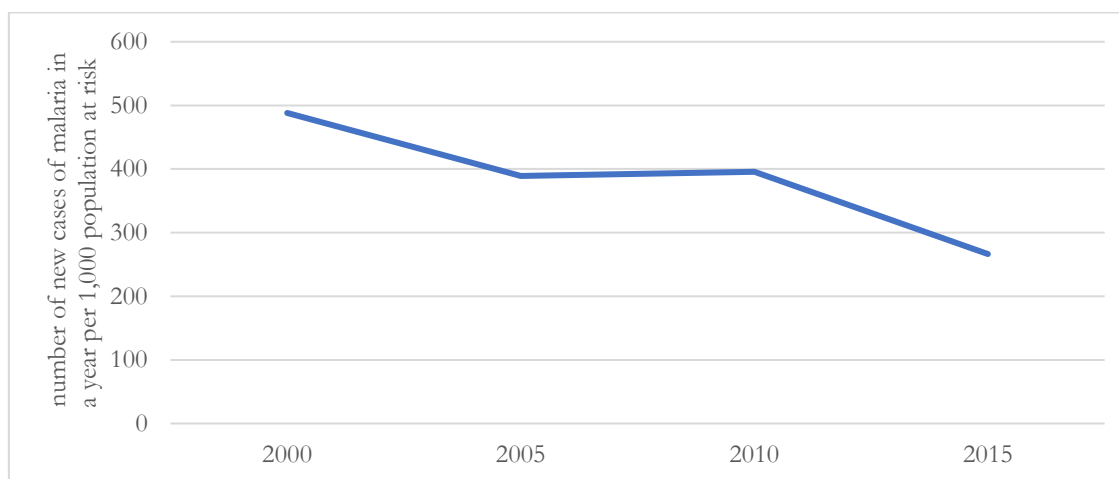
An analogous situation arises with the number of malaria deaths, but in this case the number of reported and estimated malaria deaths remains nearly constant over time. In 2013, the number of Ghanaian estimated malaria deaths were 15 thousand, from which a 17% were reported.

Figure 17. Ghanaian Malaria Incidence 2005-2014 (n° of deaths)



Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>), the World Health Organization dataset (GOH) (<http://apps.who.int/gbo/data/node.home>) and the 2016 Malaria Report by the WHO. As regards to the number of new cases of malaria in Ghana, we can state that they suffered a significant decrease from 488 new cases per 1,000 people at risk in 2000; to 266 in 2015; which accounts for a 55% decrease, as seen in Figure 18.

Figure 18. Ghanaian Malaria Incidence 2000-2015 (n° of new cases per 1,000 population at risk)

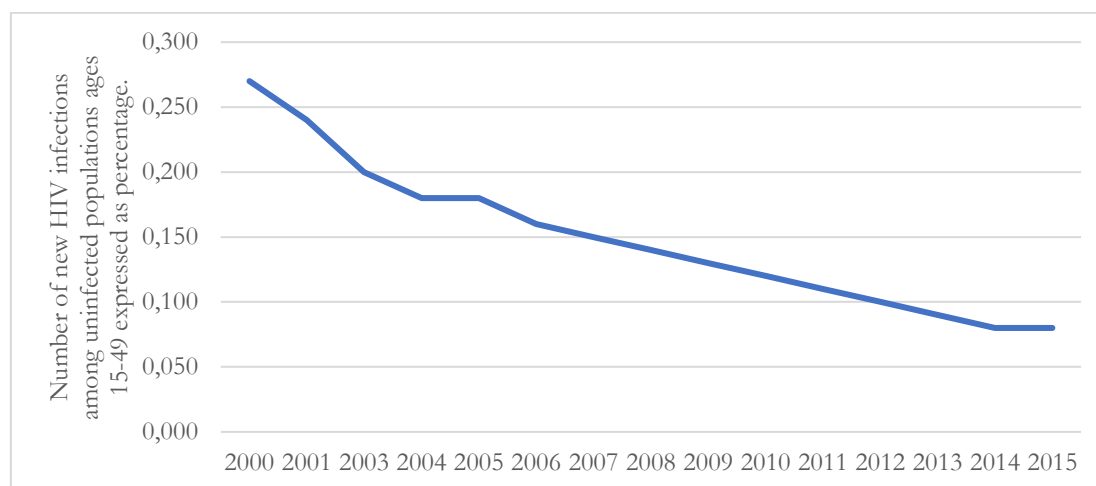


Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>)

#### 4.3.3.3. HIV

Regarding Ghanaian HIV incidence, we can state that the progress made in its reduction has been successful. In fact, the number of new HIV cases in Ghana diminished from 0.27% over uninfected population (ages 15-49) in 2000 to 0.08% in 2015, as shown in Figure 19.

Figure 19. Ghanaian Incidence of HIV 2000-2015(% of infected population ages 15-49)



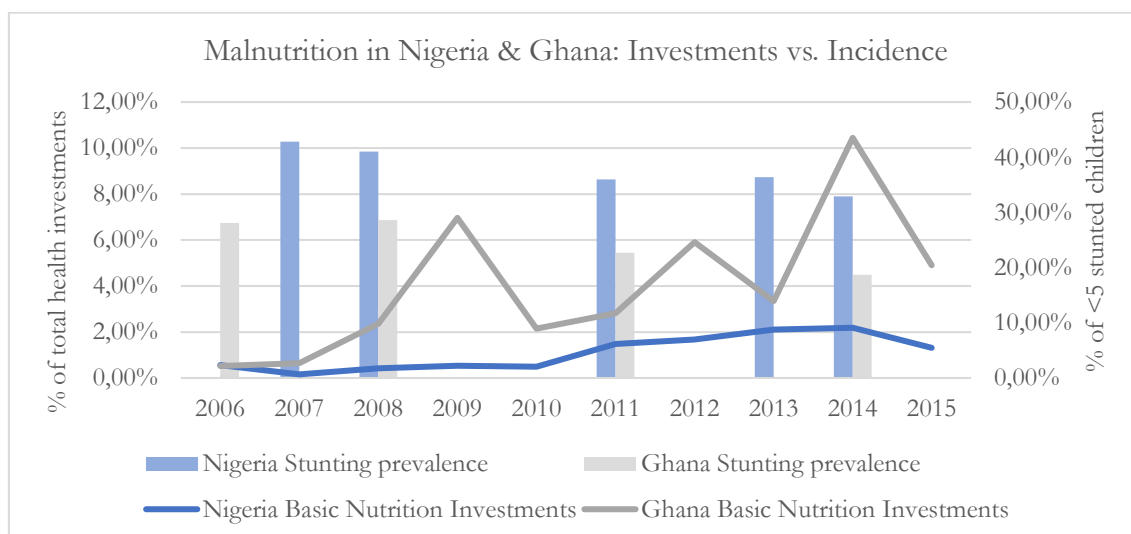
Source: Own elaboration based on data from the Word Bank's DataBank (<http://databank.worldbank.org/>)

#### 4.4. Comparison: Donations vs. Incidence

In this section, we will compare the incidence of the studied diseases versus the donations made in the countries of interest, Ghana and Nigeria. The investments in basic nutrition, malaria and STD control will be represented in relative terms, as percentage over the total health investments of the country, in order to make an adequate comparison, given the difference of dimension between the countries.

As we can see in Figure 20, the prevalence of stunted children under 5 is higher in Nigeria than in Ghana along the whole period of study (2006-2015). In 2014, the 33% of Nigerian children under five years were considered short for his age (stunted), while in Ghana the percentage was the 19%. The opposite situation occurs with the investments in Basic Nutrition, which are higher in Ghana, representing the 10.5% of total health investments of the country in 2014, whilst the figure was only the 2% in Nigeria. Even though the incidence of stunted children in Nigeria is higher than in Ghana, 14% higher in 2014; the proportion of basic nutrition investments over total health investments is lower in Nigeria, an 8.5% lower in 2014.

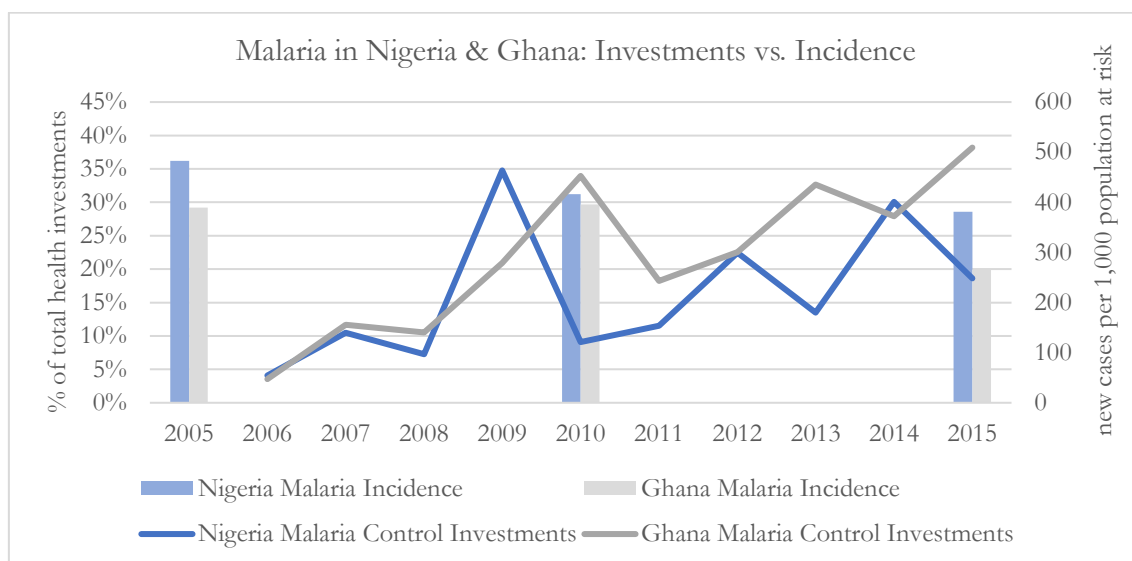
Figure 20. Malnutrition in Nigeria & Ghana: Investments vs. Incidence, 2006 - 2015



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>) & the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

In Figure 21, we can observe that the incidence of malaria in Nigeria is slightly higher during the time series presented, in fact, in 2015 there were 381 new cases of malaria per 1,000 population at risk in Nigeria towards the 266 of Ghana. Regarding the investments made in malaria control, we can observe a high volatility in both countries, but with a dominant lead of Ghana since 2009. In 2015, the 38% of investments in health were given over the battle against malaria in Ghana, in contrast to the 19% of Nigeria. Even though the incidence of malaria in Nigeria is higher than in Ghana, 115 new more cases per 1,000 population at risk in 2014; the proportion of malaria control investments over total health investments is lower in Nigeria, a 19% lower in 2014.

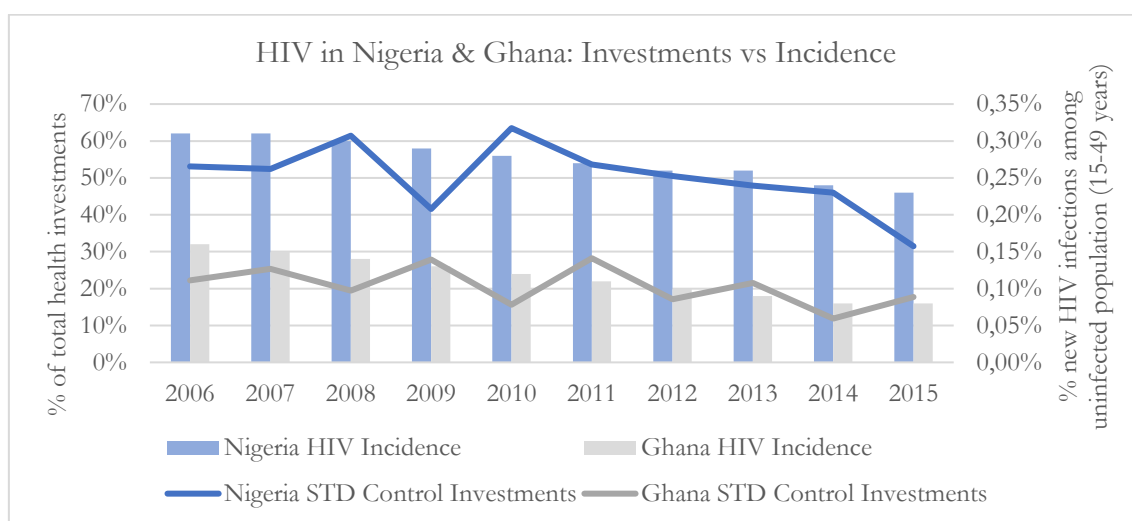
Figure 21. Malaria in Nigeria & Ghana: Investments vs. Incidence, 2006 - 2015



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>) & the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

In Figure 22, we can observe a more balanced situation among the investments made towards battling HIV and its incidence in both countries, the incidence of HIV in Nigeria is higher than in Ghana, so as the investments made in order to combat it.

Figure 22. HIV in Nigeria & Ghana: Investments vs. Incidence



Source: Own elaboration based on data from the World Bank's DataBank (<http://databank.worldbank.org/>) & the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

## 5. DISCUSSION AND CONCLUSIONS

In the study, we found a mismatch between the amount of donations directed to Malaria, HIV and Malnutrition and the incidence of these diseases in both Nigeria and Ghana.

The incidence of malaria, HIV and malnutrition is critical in the developing world, being Africa the region with an incidence above the average of developing countries in malaria and malnutrition whereas the numbers of America's health incidence are quite distant. In the case of Nigeria and Ghana, the situation is as disfavored as in the African continent, but with a special aggravation in Nigeria's incidence of HIV, malaria and malnutrition. In fact, in 2014, the proportion of children under five stunted in Nigeria was a 14% higher than in Ghana, in addition to the higher proportion of new HIV infections among uninfected population (15-49 years), which was 0.15% higher in Nigeria than in Ghana in 2015 and the 115 new more cases of malaria per 1,000 population at risk the same year. Moreover, the significant differences among the regions of the countries regarding the prevalence of stunting of children under five showed that in both countries the more disfavored areas are in the North. Many factors might be determinant of the previous fact, as for the richer commerce conditions in the Southern regions due to the closeness to the coast, aggravated in the case of Nigeria with the armed conflict situation of the Boko Haram in the North West which is misplacing millions of people in the neighboring areas, as refugees and IDPs.

Nonetheless, the trend followed by health investments in the regions of study is not in accordance with the health incidence manifested. HIV investments represent the highest proportion of investments in the developing world, Africa and America, with an average of 34% of total health investments in 2015. The second position is for malaria control investments as an average for the developing world and in Africa; but not for America where malaria control occupies the third position after basic nutrition investments. In Nigeria, the same trend of Africa is represented, where basic nutrition investments are residual and HIV and malaria investments had the highest relevance, representing a 1.3%, 32% and 19% of total health investments in 2015 respectively. Whereas in Ghana, the competition for the first position on health investments has been tight along the period of study, 2006-2015, between HIV and malaria control investments. Currently, the first position is for malaria control investments with a 38% of total health investments in 2015, followed by HIV with an 18%

and basic nutrition investments with a more representative percentage than in Nigeria, a 5% in 2015 (OECD).

In the special case of Nigeria, the refugees and IDPs crisis due to Boko Haram has created an exodus of people living in campsites with poor conditions and where acute malnutrition arises. Nonetheless, the investments made inside the country in order to battle this critical situation of undernutrition of Nigerians, specially IDPs, which accounted for more than 2 million in 2015; are still very far from HIV and malaria investments. In fact, in 2015 only the 3.56% of total health investments were earmarked for malnutrition in Nigeria, in contrast to the 32% destined to HIV and the 18.66% to malaria (see table 7, Annex 13, OECD).

Therefore, we can see that even though Ghanaian incidence of stunting is lower than in Nigeria, the efforts made to battle chronic malnutrition are higher in Ghana. The same situation occurs with malaria investments. Nevertheless, HIV investments in Ghana and Nigeria are in accordance with the incidence in both countries.

Why resources have not been allocated in a different way? The big impulse of the Bill and Melinda Gates Foundation to battle HIV since 2003, together with the creation of the Global Fund in 2002, an institution that pushes for big investments in Malaria and TB, in addition to the interest of researchers in finding a vaccine for Malaria, show much bigger efforts towards fighting these two conditions than chronic malnutrition. However, chronic malnutrition has a very important impact in children's life, contributing to delays in the development of cognitive and motor functions that will persist and limit their productivity and health along their lives and therefore lead to the poverty trap (Banerjee and Duflo, 2011).<sup>64</sup> Some authors also point to the fashions in health investments and donor investments as an explanation for the mismatch found between donations and incidence (Shiffman, 2009);<sup>65</sup> others mention the politics behind donor investments that guide more money to certain countries than others depending on political interests with a multitude of intertwined purposes resulting in varying degrees of impact and potentially harmful consequences (Seo, 2017).<sup>66</sup> Even though we cannot affirm with certainty that political and economic interests have determined the mismatch between the investments made on HIV, Malaria and Chronic

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<sup>64</sup> Banerjee, A. V., & Duflo, E. (2011). *Poor Economics, A Radical Rethinking of the Way to Fight Global Poverty*.

<sup>65</sup> Shiffman, J. (2009). A social explanation for the rise and fall of global health issues. Retrieved from Bulletin of the World Health Organization: <http://www.who.int/bulletin/volumes/87/8/08-060749/en/>

<sup>66</sup> Seo, H.-J. (2017). *Politics of Aid, A Closer Look at the Motives Behind Foreign Assistance*.



Malnutrition and their incidence in Ghana and Nigeria, we believe that they might have had some influence. Another factor to take into consideration is the complexity in the fight against chronic malnutrition because of the need of a multi-sector approach in the prevention, education, intervention and evaluation of the disease.<sup>67</sup>

From this research study, we can conclude that the health investments have not been efficiently distributed, where chronic malnutrition is the great forgotten. In fact, Ghanaian and Nigerian health investments are not aligned with its health incidence not only inside the country but also if we make a comparison between both countries. More investments need to be channeled to fight chronic malnutrition in children and of course, to pair the investments with the incidence of the conditions so as to achieve a fair and efficient allocation of resources based on need. Sometimes, decisions behind health donations turn the allocation of resources into politics, by leaving behind the scenes the real health criteria of an efficient allocation of resources. As social constructionism suggests, the rise and fall of a global health issue may have less to do with how “important” it is in any objective sense than with how supporters of the issue come to understand and portray its importance (Shiffman, 2009).<sup>68</sup>

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<sup>67</sup> The World Bank. (2006). Fighting Malnutrition in Central America. Retrieved from <http://go.worldbank.org/7SY58R2ZY0>

<sup>68</sup> Shiffman, J. (2009). A social explanation for the rise and fall of global health issues. Retrieved from Bulletin of the World Health Organization: <http://www.who.int/bulletin/volumes/87/8/08-060749/en/>

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## ANNEX 1

In this section, some tables are shown about Nigerian and Ghanaian health investments as percentage of health investments in Africa and Developing Countries 2006-2015.

Table 4. Nigerian and Ghanaian Health Investments as % of Total Investments in Developing Countries, 2006-2015

% of Developing Countries' Investments		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 2006- 2015
<b>Nigeria</b>	Health total (including HIV)	3,31%	3,75%	4,75%	6,06%	4,11%	4,30%	5,07%	6,16%	5,26%	6,25%	4,90%
	Malaria Control	3,00%	9,77%	5,25%	21,27%	3,75%	6,20%	11,15%	8,28%	15,21%	11,64%	9,55%
	Basic Nutrition	1,10%	0,33%	1,21%	1,26%	0,76%	2,36%	2,08%	2,74%	2,24%	1,63%	1,57%
	STD Control including HIV/AIDS	4,46%	4,67%	6,22%	5,62%	5,87%	4,99%	5,81%	7,40%	6,38%	5,82%	5,72%
<b>Ghana</b>	Health total (including HIV)	1,50%	1,35%	1,38%	1,39%	1,31%	1,16%	1,54%	1,35%	1,09%	1,19%	1,33%
	Malaria Control	1,18%	3,91%	2,21%	2,94%	4,48%	2,66%	3,41%	4,39%	2,92%	4,55%	3,27%
	Basic Nutrition	0,46%	0,48%	1,95%	3,76%	1,07%	1,22%	2,24%	0,95%	2,21%	1,17%	1,55%
	STD Control including HIV/AIDS	0,85%	0,81%	0,57%	0,87%	0,46%	0,71%	0,60%	0,73%	0,34%	0,63%	0,66%

Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Table 5. Nigerian and Ghanaian Health Investments as % of Total Investments in Africa Total, 2006-2015

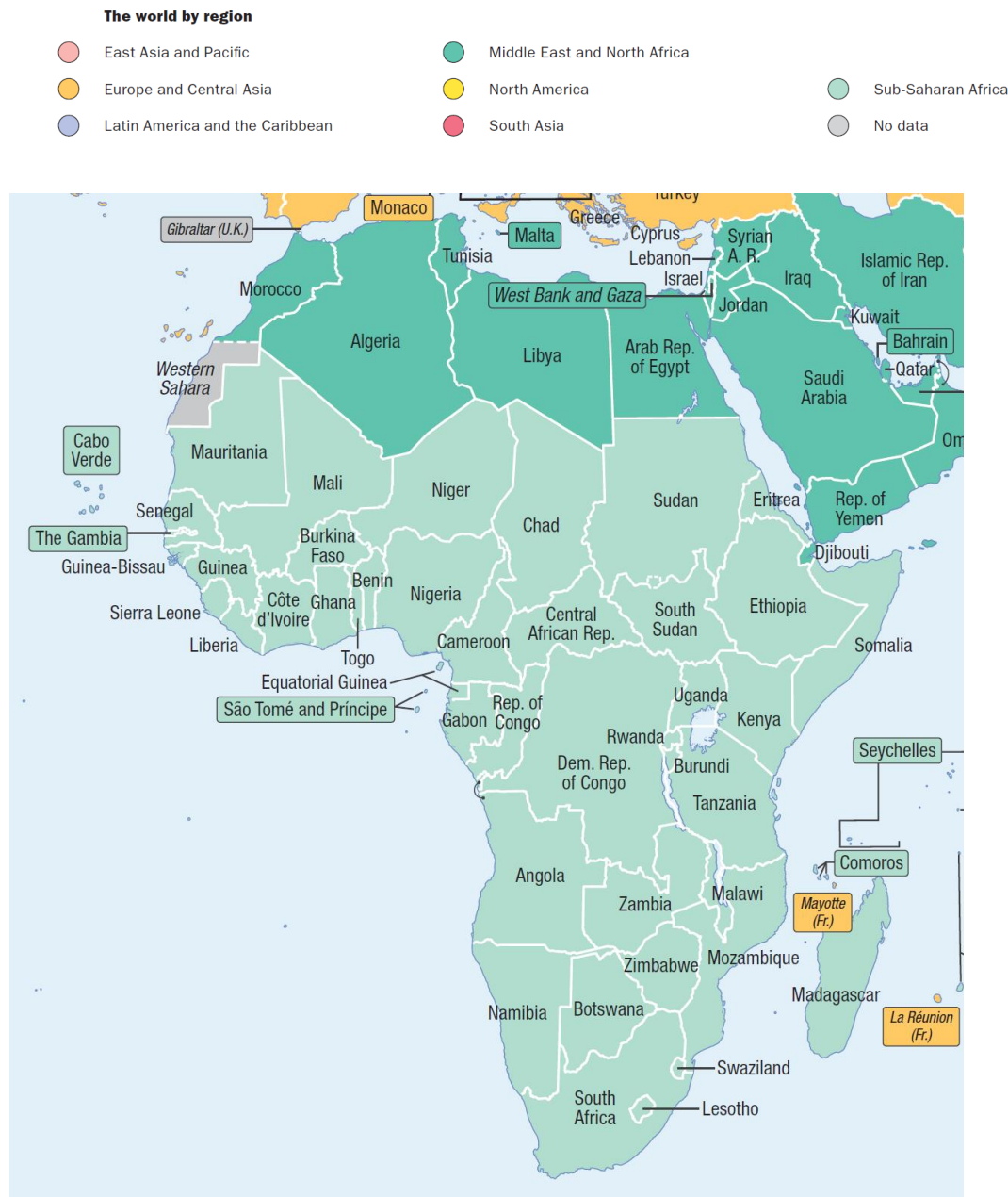
% of African Investments		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 2006-2015
Nigeria	Health total (including HIV)	7,39%	8,41%	9,04%	11,80%	8,04%	8,33%	9,19%	11,14%	9,27%	10,94%	9,35%
	Malaria Control	3,67%	12,32%	7,04%	26,15%	5,24%	7,98%	14,22%	10,64%	19,31%	14,07%	12,07%
	Basic Nutrition	2,59%	0,91%	2,11%	2,32%	1,33%	4,45%	3,95%	4,73%	3,61%	3,14%	2,91%
	STD Control including HIV/AIDS	8,85%	8,46%	10,25%	9,76%	9,66%	8,85%	9,41%	11,74%	9,76%	10,04%	9,68%
Ghana	Health total (including HIV)	3,36%	3,02%	2,63%	2,71%	2,57%	2,25%	2,80%	2,44%	1,92%	2,09%	2,58%
	Malaria Control	1,45%	4,93%	2,97%	3,62%	6,26%	3,42%	4,35%	5,64%	3,70%	5,50%	4,18%
	Basic Nutrition	1,08%	1,35%	3,41%	6,93%	1,87%	2,30%	4,24%	1,64%	3,57%	2,26%	2,87%
	STD Control including HIV/AIDS	1,68%	1,47%	0,95%	1,50%	0,76%	1,26%	0,97%	1,16%	0,52%	1,08%	1,13%

Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

## ANNEX 2

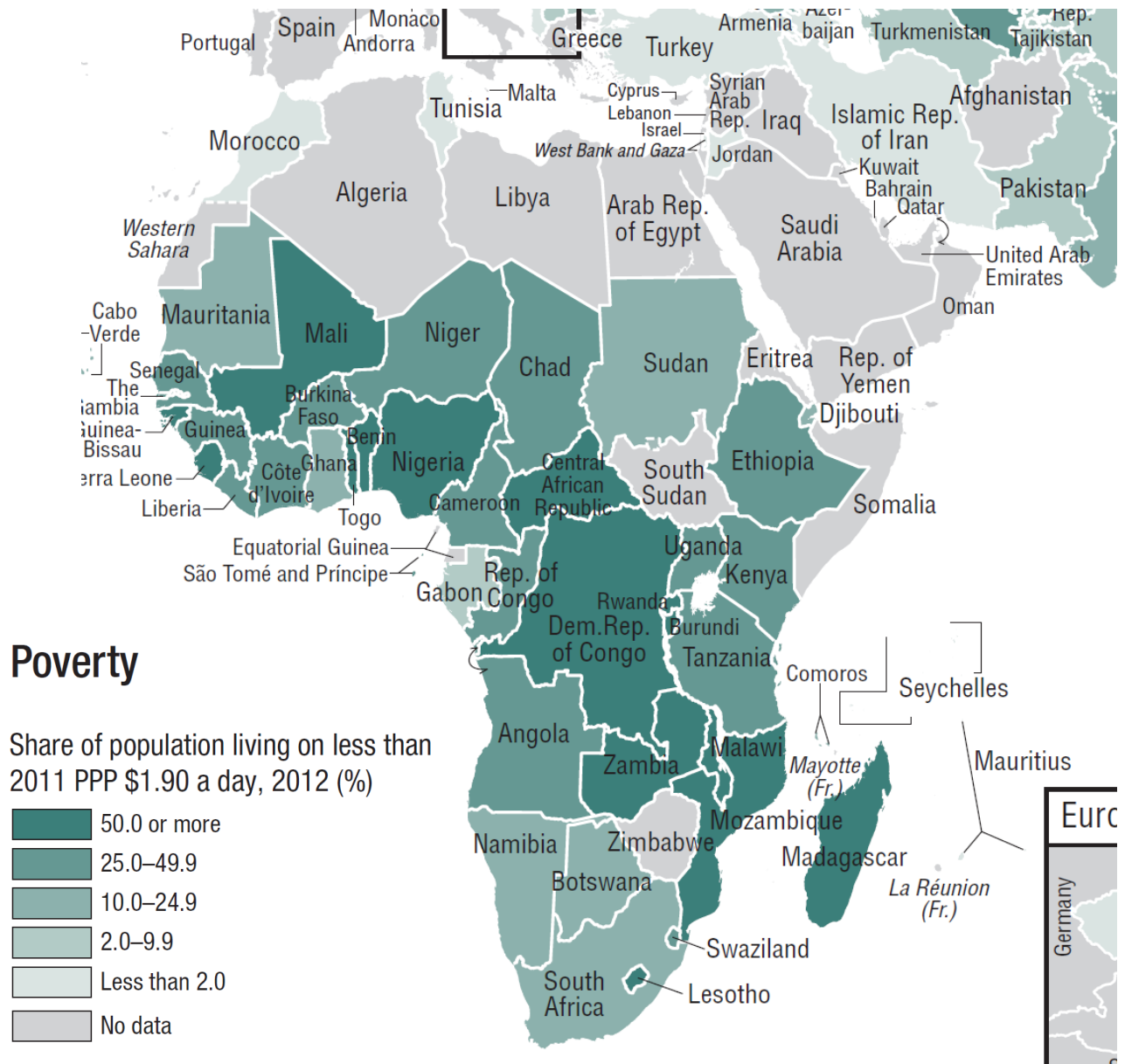
In this section, we will see some layouts of the World Bank describing some important topics as for region, poverty, income and education.

*Layout 1. The World by Region*



Source: The World Bank. (2016). *World Development Indicators 2016 - Maps*. Retrieved from <http://data.worldbank.org/products/wdi-map>

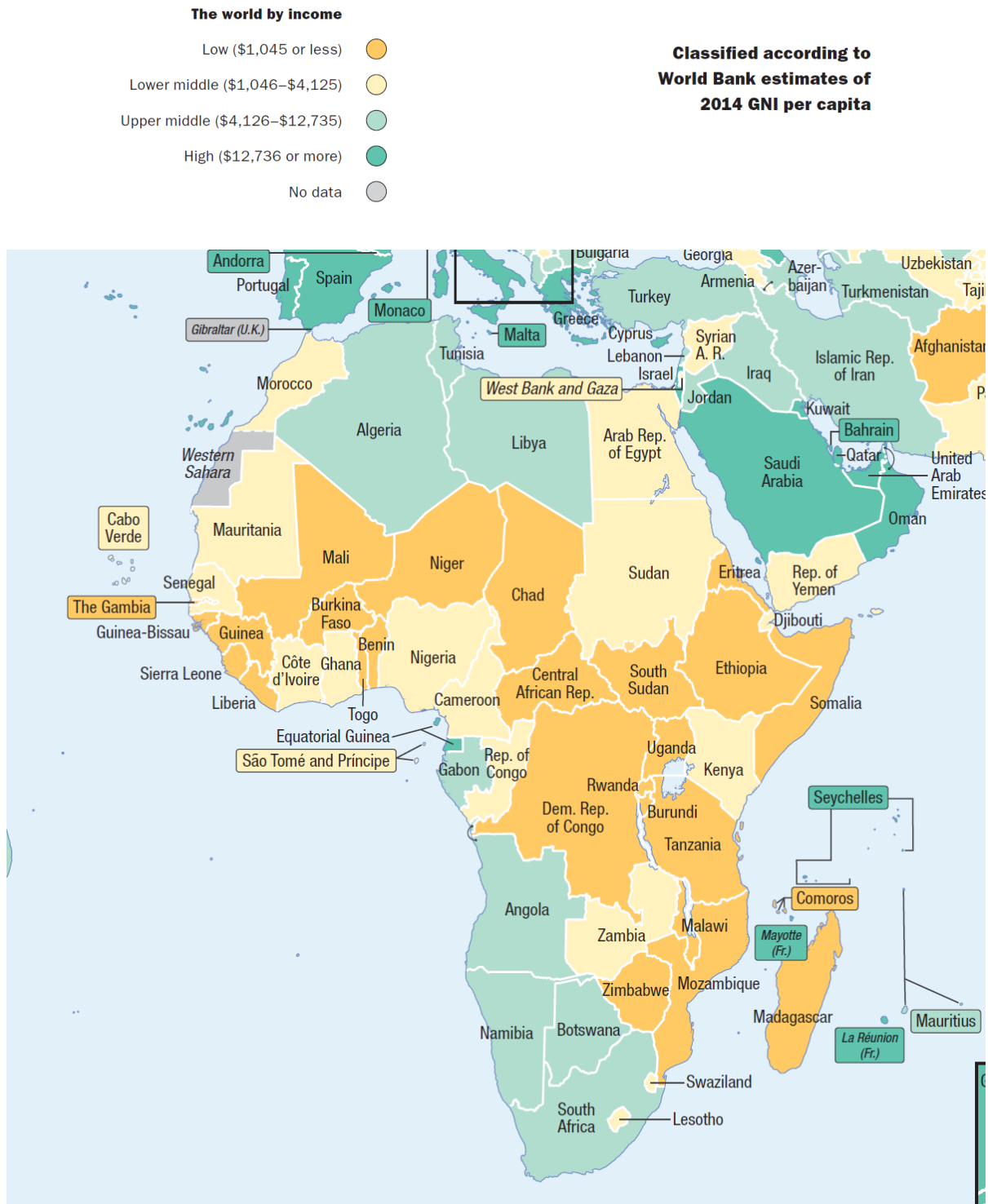
*Layout 2. Poverty in the World (share of population living on less than 2011 PPP \$1.90 a day, 2012 %)*



Source: The World Bank. (2016). *World Development Indicators 2016 - Maps*. Retrieved from <http://data.worldbank.org/products/wdi-map>

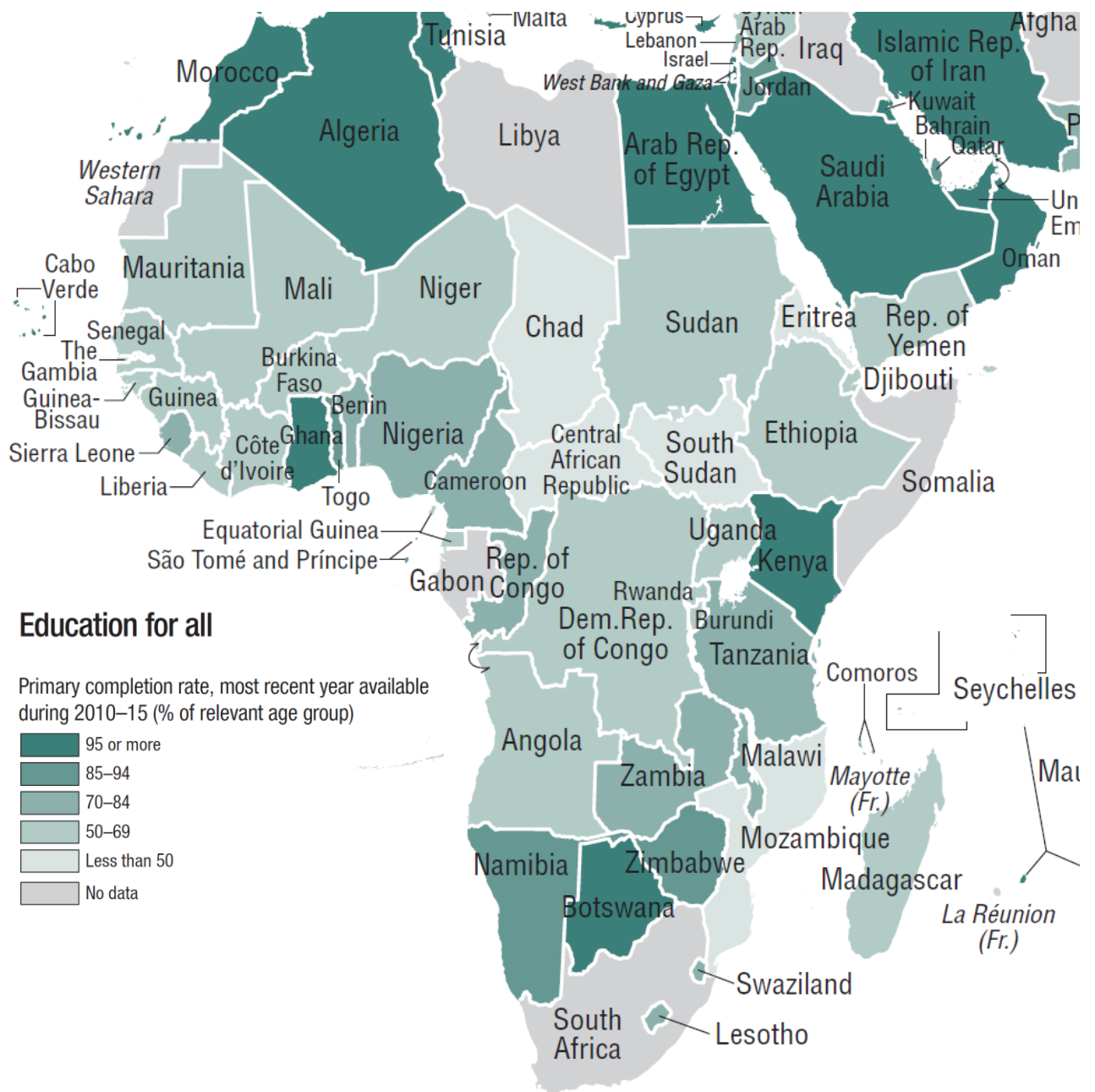


Layout 3. World by Income (2014 GNI per capita)



Source: The World Bank. (2016). World Development Indicators 2016 - Maps. Retrieved from <http://data.worldbank.org/products/wdi-map>

Layout 4. World Education (primary completion rate 2010-15)



Source: The World Bank. (2016). World Development Indicators 2016 - Maps. Retrieved from <http://data.worldbank.org/products/ndi-map>

## ANNEX 3

In this section, some tables about the refugee situation in Nigeria are presented.

Table 6. Nigerian Refugees and IDPs in 2015

REFUGEES					IDPs	Others	Total
Refugees	People in refugee-like situations	Total refugees and people in refugee-like situations	of whom: UNHCR-assisted	Asylum-seekers (pending cases)	IDPs protected/assisted by UNHCR, incl. people in IDP-like situations	Others of concern to UNHCR	Total population of concern
152.136	15.852	167.988	146.107	51.863	2.172.532	19	2.392.402

Source: Own elaboration based on data from the UNHCR's Population Statistics  
([http://popstats.unhcr.org/en/overview/#\\_ga=1.220600017.851890232.1491413062](http://popstats.unhcr.org/en/overview/#_ga=1.220600017.851890232.1491413062))

Table 7. Nigerian Refugees by Country of Asylum 2015

Country/ Territory of Asylum	Population start-2015		Population end-2015	
	TOTAL	of whom: UNHCR-assisted	TOTAL	of whom: UNHCR-assisted
Cameroon	39.968	24.874	71.840	71.840
Canada	4.683	-	4.502	-
Chad	2.930	2.327	5.689	5.689
France	1.102	-	1.250	-
Italy	6.293	-	9.931	-
Niger	30.000	30.000	68.321	68.321
United Kingdom	1.471	-	1.679	-

Source: Own elaboration based on data from the UNHCR's Population Statistics  
([http://popstats.unhcr.org/en/overview/#\\_ga=1.220600017.851890232.1491413062](http://popstats.unhcr.org/en/overview/#_ga=1.220600017.851890232.1491413062))

Table 8. Nigerian refugees by Region of Asylum 1990-2013

Country/Region/Area of Destination	n° of migrants			% of total migrants, each year		
	1990	2000	2013	% of total 1990	% of total 2000	% of total 2013
<b>1. WORLD</b>	<b>465728</b>	<b>625993</b>	<b>1029466</b>	<b>100,00%</b>	<b>100,00%</b>	<b>100,00%</b>
More developed regions	157326	326323	632782	33,78%	52,13%	61,47%
Less developed regions	308402	299670	396684	66,22%	47,87%	38,53%
<b>SUB-SAHARAN AFRICA</b>	<b>288952</b>	<b>279818</b>	<b>362146</b>	<b>62,04%</b>	<b>44,70%</b>	<b>35,18%</b>
<b>2. AFRICA</b>	<b>291649</b>	<b>282821</b>	<b>366747</b>	<b>62,62%</b>	<b>45,18%</b>	<b>35,62%</b>
Eastern Africa	302	184	3250	0,06%	0,03%	0,32%
Middle Africa	129004	121885	154751	27,70%	19,47%	15,03%
Northern Africa	25768	26888	19876	5,53%	4,30%	1,93%
Southern Africa	9093	7109	19338	1,95%	1,14%	1,88%
Western Africa	127482	126755	169532	27,37%	20,25%	16,47%

Source: Own elaboration based on data from the UN's World Population Prospects the 2015 Revision  
(<https://esa.un.org/unpd/wpp/>)

## ANNEX 4

In this section, some tables for the African Outlook report are shown, in order to describe the health system in Nigeria and Ghana.

Table 9. Basic Health Indicators Nigeria, Ghana and Africa Total

Region	Total Health Expenditure		Health Personnel (per 100,000)	
	<i>As % of GDP</i>	<i>Per capita (USD)</i>	<i>Physicians</i>	<i>Nurses</i>
	2014		Survey year	Survey year
Nigeria	3,7	115	41 (2008)	161 (2009)
Ghana	5,4	99,5	10 (2010)	93 (2010)
Africa	5,7	236,1	...	...

Source: Own elaboration based on data from the African Development Bank Group, OECD and UN. (2016). *African Economic Outlook, Sustainable Cities and Structural Transformation*.

Table 10. Major Diseases in Nigeria, Ghana and Africa Total

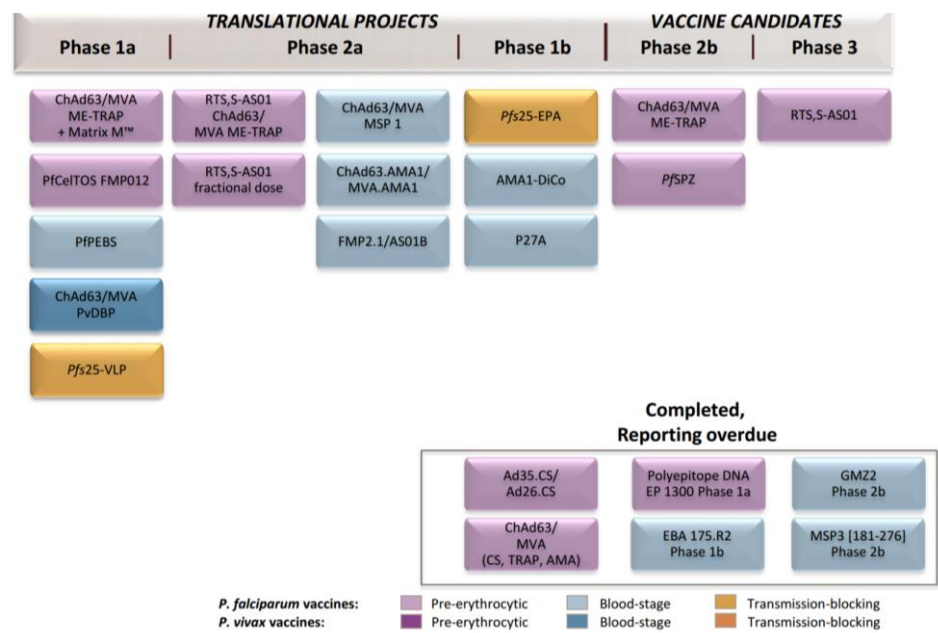
Region	HIV/AIDS			Malaria	Tuberculosis	Measles	Vaccination (%)	
	<i>People living with HIV/AIDS</i>	<i>Adult Prevalence (%)</i>	<i>AIDS deaths in adults and children (000)</i>	<i>number of reported cases</i>	<i>new and relapse cases</i>	<i>Incidence (number of reported cases)</i>	<i>MCV</i>	<i>DTP3</i>
	2014			Survey year	2014	2014	2014	
Nigeria	3392	3,2	174,3	551187(2010)	86464	6855	51	66
Ghana	250	1,5	9,2	1639451 (2013)	14668	124	92	98
Africa	25950	3,8	801,1	45368192	1376548	86579	75	79

Source: Own elaboration based on data from the African Development Bank Group, OECD and UN. (2016). *African Economic Outlook, Sustainable Cities and Structural Transformation*.

ANNEX 5

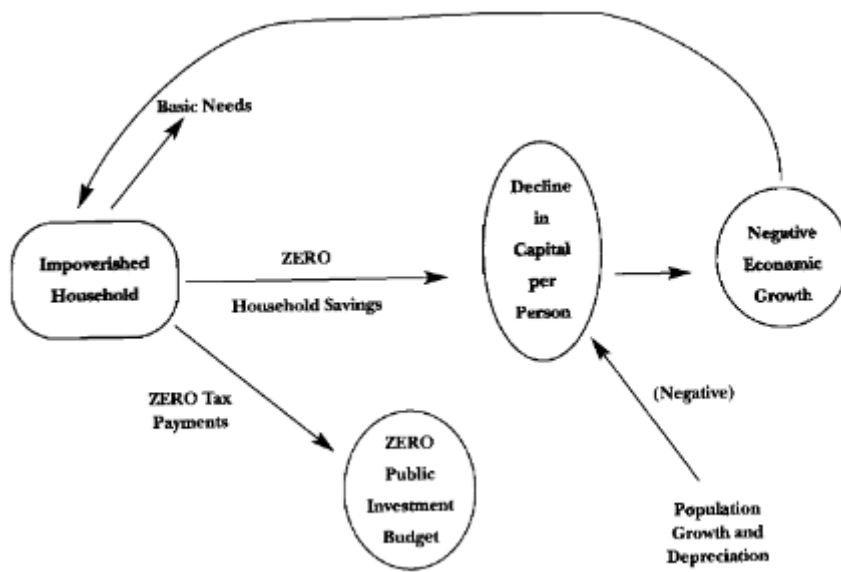
In this section, information about the different topics of interest for the study is shown.

Figure 23. Global malaria vaccine pipeline



Source: World Health Organization (WHO). (2016, October 5). *Immunization, Vaccines and Biologicals*. Retrieved from [http://www.who.int/immunization/research/development/Rainbow\\_tables/en/](http://www.who.int/immunization/research/development/Rainbow_tables/en/)

Figure 24. Poverty Trap



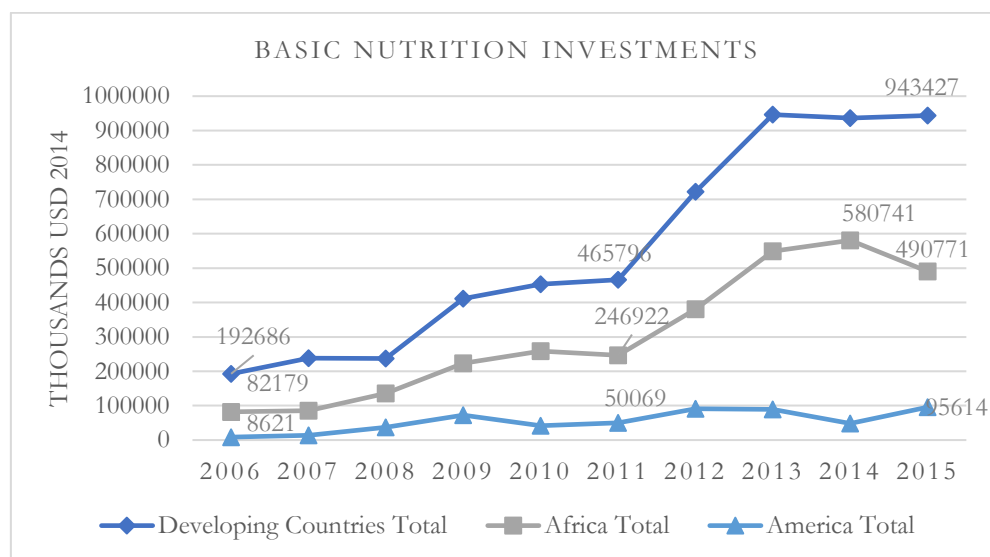
In figure 2, the process breaks down into a poverty trap. We start again on the left-hand side, but now with a household that is impoverished. All of its income goes to consumption, just to stay alive. There are no taxes and no personal savings. Nonetheless, depreciation and population growth continue relentlessly. The result is a fall in capital per person and a negative growth rate of per capita income. That leads to still further impoverishment of the household in the future.

Source: Sachs, J. (2005). *The End of Poverty: How We Can Make It Happen in Our Lifetime*

## ANNEX 6

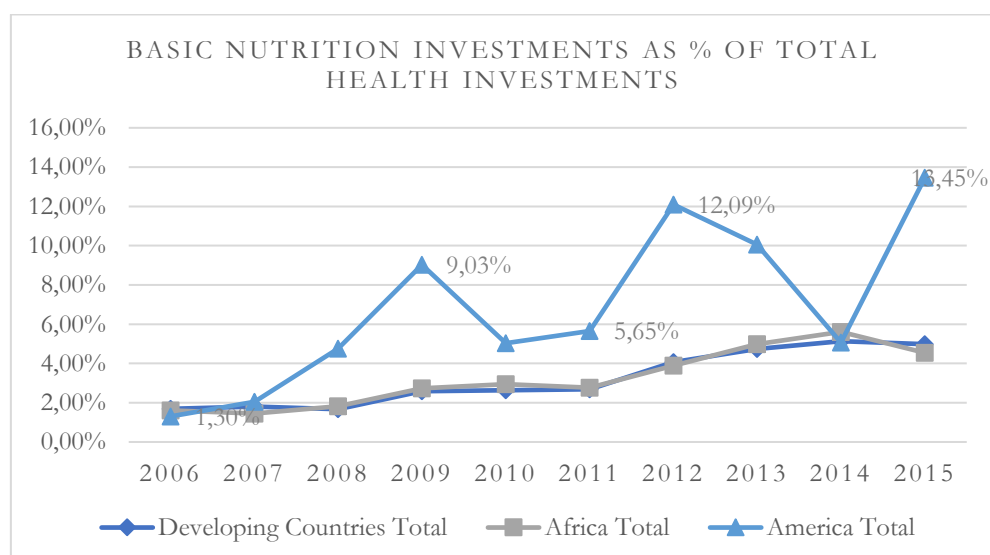
In this section, a more detailed description about worldwide health investments is provided for the following regions, Developing Countries Total, Africa Total and America Total; among the years 2006 and 2015.

Figure 25. Basic Nutrition Investments 2006-2015, a World Overview



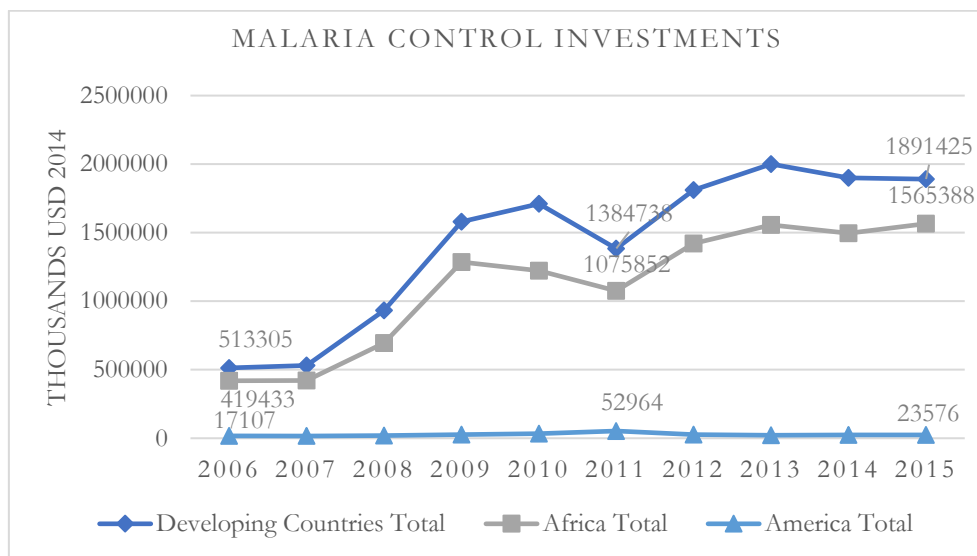
Source: Own elaboration based on data from the OECD's Statistics, CRS  
(<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Figure 26. Basic Nutrition Investments over Total Health Investments 2006-2015, a World Overview



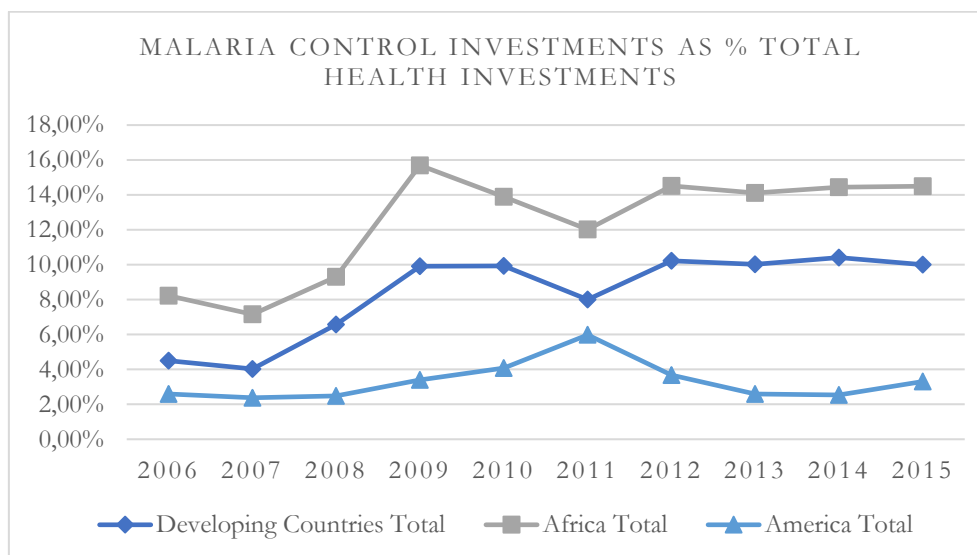
Source: Own elaboration based on data from the OECD's Statistics, CRS  
(<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Figure 27. Malaria Control Investments 2006-2015, a World Overview



Source: Own elaboration based on data from the OECD's Statistics, CRS  
<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>

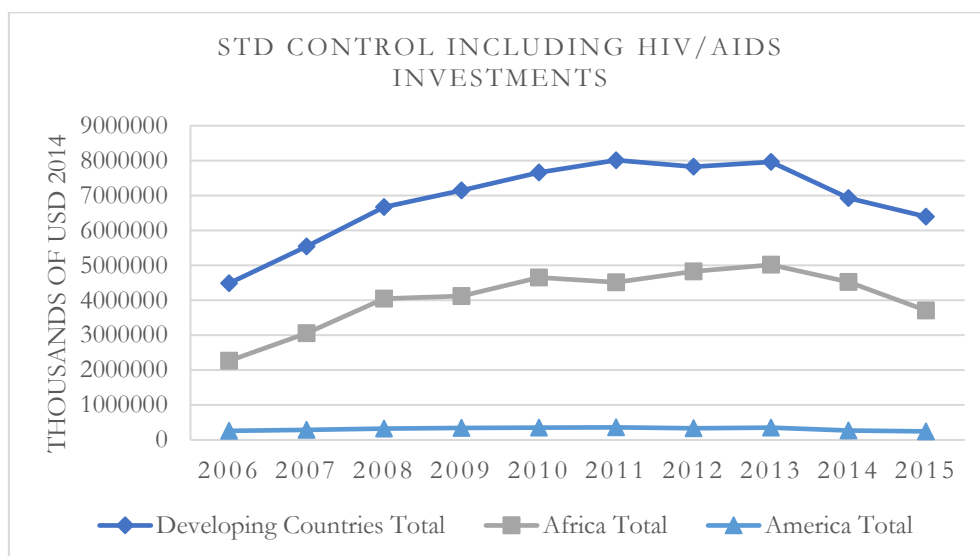
Figure 28. Malaria Control Investments over Total Health Investments 2006-2015, a World Overview



Source: Own elaboration based on data from the OECD's Statistics, CRS  
<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>

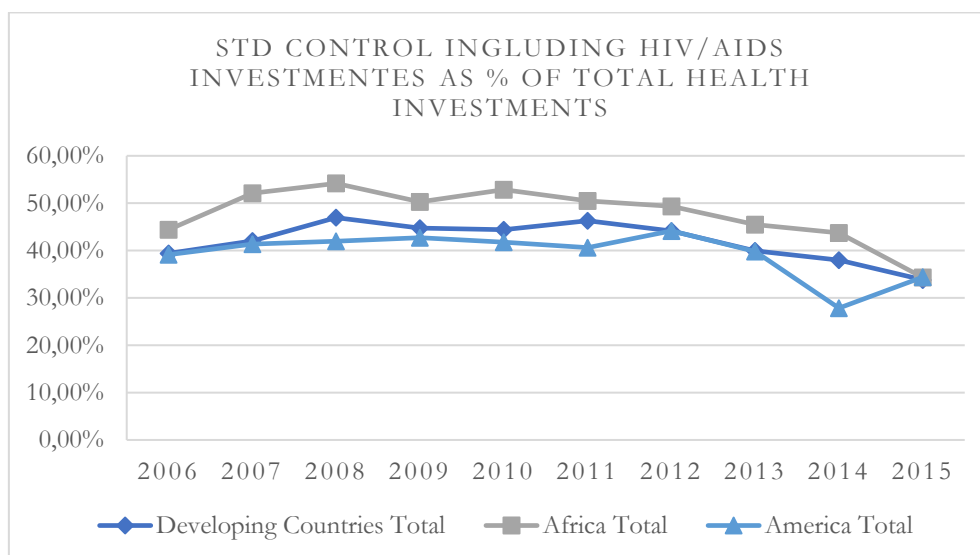


Figure 29. STD Control Investments (including HIV/AIDS) 2016-2015, a World Overview



Source: Own elaboration based on data from the OECD's Statistics, CRS  
(<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Figure 30. STD Control Investments over Total Health Investments 2006-2015, a World Overview



Source: Own elaboration based on data from the OECD's Statistics, CRS  
(<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Table 11. Africa and America Health Investments as % of Developing Countries' Investments, 2006-2015

% of Developing Countries' Investments		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 2006- 2015
<b>Africa</b>	Health total (including HIV)	44,78%	44,62%	52,58%	51,33%	51,05%	51,66%	55,22%	55,28%	56,76%	57,12%	52,04%
	Malaria Control	81,71%	79,25%	74,52%	81,33%	71,50%	77,69%	78,44%	77,84%	78,75%	82,76%	78,38%
	Basic Nutrition	42,65%	35,76%	57,31%	54,33%	57,13%	53,01%	52,76%	57,99%	62,00%	52,02%	52,50%
	Std Control including HIV/AIDS	50,45%	55,26%	60,68%	57,62%	60,72%	56,38%	61,67%	62,99%	65,35%	57,96%	58,91%
<b>America</b>	Health total (including HIV)	5,80%	5,26%	5,46%	5,02%	4,84%	5,12%	4,24%	4,45%	5,26%	3,76%	4,92%
	Malaria Control	3,33%	3,10%	2,06%	1,73%	1,99%	3,82%	1,53%	1,15%	1,28%	1,25%	2,13%
	Basic Nutrition	4,47%	5,97%	15,52%	17,59%	9,28%	10,75%	12,59%	9,44%	5,19%	10,13%	10,09%
	Std Control including HIV/AIDS	5,76%	5,17%	4,88%	4,79%	4,55%	4,49%	4,24%	4,44%	3,85%	3,82%	4,60%

Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

Table 12. Average proportion of Malaria, HIV and Basic Nutrition Investments over Total Health Investments, a World Overview (2006-2015)

% of Total Health Investments Including HIV/AIDS - average (2006-2015)	Developing Countries Total	Africa Total	America Total
Malaria Control	8,36%	12,39%	3,30%
Basic Nutrition	3,20%	3,23%	6,85%
Std Control including HIV/AIDS	41,97%	47,71%	39,36%

Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)

## ANNEX 7

In this section, the investments made in Nigeria as emergency food aid and food aid and food security programs are presented.

Table 13. Health Investments in Nigeria including Emergency Food Aid

% Total Health Investments*		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Nigeria	Malaria Control	3,92%	9,82%	6,92%	33,45%	8,63%	11,22%	21,62%	13,28%	29,16%	18,66%
	Nutrition (including basic nutrition, emergency food aid and food aid and food security programs)	0,54%	0,85%	0,42%	0,52%	1,26%	2,28%	2,49%	2,80%	3,16%	3,56%
	STD Control including HIV/AIDS	54,89%	54,17%	63,64%	43,83%	65,04%	55,24%	51,81%	49,28%	47,14%	32,03%

\*Data retrieved in constant 2015 US\$, it might be slightly different with the previous data retrieved in constant 2014 US\$.

Source: Own elaboration based on data from the OECD's Statistics, CRS (<https://stats.oecd.org/Index.aspx?DataSetCode=CRS>)